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Philip M. Klutznick
Secretary of Commerce

NATIONAL TECHNICAL INFORMATION SERVICE
Melvin S. Day, Director

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GOVERNMENT REPORTS ANNOUNCEMENTS & INDEX

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FIELD 10. ENERGY CONVERSION (Non-propulsive). Includes the following Groups: Conversion Techniques; Power Sources; Energy Storage.

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*These categories were endorsed by the Committee on Scientific & Technical Information (COSATI) of the Federal Council for Science & Technology in 1964. A booklet describing these categories is available from NTIS; the order number is AD-612 200.

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SAMPLE ENTRIES

MAIN ENTRY

Report entries are arranged by subject group and field. Within fields they are arranged alphanumerically by NTIS order number (accession number); alphabetic data precedes numeric.

Field 10 ENERGY CONVERSION (NON-PROPULSIVE)

Group 10A Conversion Techniques

PB-254 315/5GA — Order number
PC **A16/MF A01** — Price codes
Smithsonian Science Information Exchange, Inc., Washington, D.C. — Corporate author
Information on International Research and Development Activities in the Field of Energy, David F. Hersey. May 76, 370p* — Report title; Personal author
NSF/RA-760057, Grant NSF-AER74-20678

Descriptors: *Directories, *Indexes (Documentation), *Energy, Research projects, Foreign countries, Bibliographies, Abstracts. Identifiers: Announcement bulletins. — Keywords — descriptors & identifiers

This directory is the product of a data collection effort undertaken by the Smithsonian Science Information Exchange (SSIE) on behalf of an interagency committee formed under the U.S. State Department to provide international cooperation in energy research and development. Included is information covering 1766 ongoing and recently completed energy research projects conducted in Canada, Italy, the Federal Republic of Germany, France, the Netherlands, the United Kingdom, and 25 other countries. In addition to the title and text of project summaries, the directory contains the following indexes: Subject Index, Investigator Index, Performing Organization Index, and Supporting Organization Index. — Abstract of report

INDEX ENTRIES

Index entries are arranged alphanumerically. Titles are included in all indexes except the Contract Number index.

SUBJECT

ENERGY
Information on International Research and Development Activities in the Field of Energy.
PB-254 315/5GI 10A

Entries are sequenced by major subject term (the keywords with an asterisk) and by NTIS order number.

PERSONAL AUTHOR

HERSEY, DAVID F.
Information in International Research and Development Activities in the Field of Energy.
PB-254 315/5GI 10A

Entries are sequenced by personal author, report title, and NTIS order number.

CORPORATE AUTHOR

SMITHSONIAN SCIENCE INFORMATION EXCHANGE, INC., WASHINGTON, D.C.
Information on International Research and Development Activities in the Field of Energy.
(NSF/RA-760057)
PB-254 315/5GI 10A

Entries are sequenced by corporate author name, original report number, and NTIS order number. The monitor agency number is given following the report title.

CONTRACT GRANT NUMBER

NSF-AER74-20678
Smithsonian Science Information Exchange, Inc., Washington, D.C.
PB-254 315/5GI 10A

Entries are sequenced by contract or grant number, corporate author, and NTIS order number.

ACCESSION/REPORT NUMBER

PB-254 315/5GI
Information on International Research and Development Activities in the Field of Energy.
PB-254 315/5GI 10A PC **A16/MF A01**

Entries are sequenced by NTIS order, original report, or monitor agency number. Price codes are given in this index.

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REPORTS ANNOUNCEMENTS

1. AERONAUTICS

1A. Aerodynamics

AD-A075 885/4 PC **A03**/MF **A01**
Cornell Univ Ithaca N Y Graduate School of Aerospace Engineering
On Mach Reflection and Strength of Reflected Shock.
Technical rept.,
H. S. Tan. Jul 52, 26p WADC-TR-52-163
Contract AF 33(038)-21406

The configuration of non-stationary Mach reflection has a conical similarity in time-space, since there is no fundamental time or space interval involved. This property is easily shown, and can be used to simplify the determination of various disturbance quantities. For this type of reflection the strength of the reflected shock depends on that of the incident shock and also on the deflection angle. To the first approximation, this reflected wave is a sonic front. Thus, the resulting boundary-value problem in linearized theory is relatively simple, and has been attacked by several investigators. The extension to second-order theory is discussed but is not carried out in detail. Based on the results obtained from linear theory, it is shown how the shock strength can actually be determined to the second order. The strength of this reflected shock is found to be of second order, and it vanishes at the triple point. (Author)

AD-A076 029/8 MF **A01**
Cornell Univ Ithaca N Y Graduate School of Aerospace Engineering
Second Approximation to Conical Flows.
Technical rept.,
H. S. Tan. Dec 50, 69p WADC-TR-52-277
Contract AF 33(038)-9832
Availability: Microfiche copies only.

The method of expansion in powers of a thickness parameter is employed to calculate supersonic, inviscid flow about symmetrical arrow-head wings lying entirely within the tip Mach cone. In this method, the first order terms constitute the familiar, linearized Prandtl-Glauert approximation. The method is one of iteration. Here the second approximation is computed and plotted for a family of arrow-head wings having various leading-edge angles and thicknesses, and flying at various Mach numbers. It is necessary to use Lighthill's method to determine the strength of the attached conical shock.

AD-A076 128/8 PC **A03**/MF **A01**
Weapons Systems Research Lab Adelaide (Australia)
Calculation of Subsonic Normal Force and Centre of Pressure Position of Bodies of Revolution using a Slender Body Theory - Boundary Layer Method.
Technical rept.,
K. D. Thomson. Apr 79, 37p Rept no. WSRL-0093-TR

The aim of this report is to present a method of predicting the aerodynamic characteristics of slender bodies of revolution at small incidence, under flow conditions such that the boundary layer is turbulent. Firstly, a panel method based on slender body theory is developed and used to calculate the surface velocity distribution on the body at zero incidence. Secondly this velocity distribution is used in conjunction with an existing boundary layer estimation method to calculate the growth of boundary layer displacement thickness which is added to the body to produce the effective aerodynamic profile. Finally, recourse is again made to slender body theory to calculate the normal force curve slope and centre of pressure position of the effective aerodynamic profile. Comparisons made between predictions and experiment for a number of slender bodies extending from highly boattailed configurations to ogive-cylinders, and covering a large range of boundary layer growth rates, indicate that the method is useful for missile design purposes. (Author)

N80-10105/8 PC **A04**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
Estimation of Attainable Leading-Edge Thrust for Wings at Subsonic and Supersonic Speeds.
H. W. Carlson, R. J. Mack, and R. L. Barger.
1979, 62p NASA-TP-1500, L-13032

The factors which place limits on the theoretical leading edge thrust are identified. An empirical method for the estimation of attainable thrust is presented. The method is based on the use of simple sweep theory to permit a two dimensional analysis, the use of theoretical airfoil programs to define thrust dependence on local geometric characteristics, and the examination of experimental two dimensional airfoil data to define limitations imposed by local Mach numbers and Reynolds numbers. Comparisons of theoretical and experimental aerodynamic characteristics for a series of wing body configurations are examined.

N80-10135/5 PC **A12**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
Low-Speed Wind-Tunnel Tests of a 1/10-Scale Model of an Advanced Arrow-Wing Supersonic Cruise Configuration Designed for Cruise at Mach 2.2.
L. P. Yip. Aug 79, 265p NASA-TM-80152

The low-speed longitudinal and lateral-directional characteristics of a scale model of an advanced arrow-wing supersonic cruise configuration were investigated in tests conducted at a Reynolds number of 4.19 x 10 to the 6th power based on the mean aerodynamic chord, with an angle of attack range from - 6 deg to 23 deg and sideslip angle range from -15 deg to 20 deg. The effects of segmented leading-edge flaps, slotted trailing-edge flaps, horizontal and vertical tails, and ailerons and spoilers were determined. Extensive pressure data and flow visualization pictures with non-intrusive fluorescent mini-tufts were obtained.

N80-10136/3 PC **A09**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
A Flight Investigation of Performance and Loads for a Helicopter with NLR-1T Main-Rotor Blade Sections.
C. E. K. Morris, Jr., R. L. Tomaine, and D. D. Stevens. Oct 79, 176p NASA-TM-80165
Subm-Prepared in Cooperation with Army Research and Technology Labs., Hampton, VA.

Data on performance and rotor loads for a teetering-rotor, AH-1G helicopter flown with a main rotor that had the NLR-1T airfoil as the blade-section contour are presented. The test envelope included hover, forward-flight speed sweeps from 35 to 85 m/sec, and collective-fixed maneuvers at about 0.25 tip-speed ratio. The data set for each test point described vehicle flight state, control positions, rotor loads, power requirements, and blade motions. Rotor loads are reviewed primarily in terms of peak-to-peak and harmonic content. Lower frequency components predominated for most loads and generally increased with increased airspeed, but not necessarily with increased maneuver load factor.

1B. Aeronautics

AD-A076 042/1 PC **A04**/MF **A01**
Martin Co Baltimore Md
Landing Vertical Velocity and Acceleration Measurements of Berlin Airlift C-54 Aircraft.
Technical rept.,
J. J. Saunders , and G. F. Piper. Jul 53, 57p
WADC-TR-53-104
Contracts AF 33(616)-397, AF 33(038)-9351

Photographic records of landings of the Berlin Airlift with C-54 aircraft have been analyzed. The results have consisted of sinking speeds, accelerations, horizontal speeds, and wing load factors at touchdown during landing. The analysis has been conducted for the purpose of obtaining accessory data that can be used in arriving at a design criterion for the selection of limit sinking speeds of land based aircraft. The probability of equalling or exceeding a given sinking speed or horizontal speed has been calculated and presented in curve form. The limitations of the results concerning the extension of the data to cases not included in the analysis have been indicated. The nature and scope of further sampling have been discussed. Suggestions have been made concerning the usage of this and future data. (Author)

AD-A076 194/0 MF **A01**
Civil Aeronautics Board Washington D C
Airport Activity Statistics of Certificated Route Air Carriers.
Semi-Annual rept.
31 Dec 78, 613p
Prepared in cooperation with Federal Aviation Administration, Washington, DC. Office of Management Systems.
Availability: Superintendent of Documents, GPO, Washington, DC 20402 HC $6.00 Microfiche furnished to DTIC (and NTIS) users.

This report furnishes airport activity of the Certificated Route Air Carriers. Included in the data contained in Table 6 are passenger enplanements, tons of enplaned freight, express, and mail. Both scheduled and non-scheduled serivce, and domestic and international operations are included. These data are shown by airport and carrier. Table 7 includes departures by airport, carrier and type of operation, and type of aircraft. (Author)

AD-A076 221/1 PC **A02**/MF **A01**
Defence and Civil Inst of Environmental Medicine Downsview (Ontario)
Human Factors in High Speed Low Level Accidents - A 15 Year Review,
R. C. Rud , and D. F. Leben. Jul 79, 13p Rept no. DCIEM-79R35

The Canadian Forces introduced the CF 104G into Squadron Operation in 1963 and since that time these aircraft have operated in the high-speed, low-level environment in both the strike/reconnaissance and tactical support roles. Fifty-seven accidents involving these aircraft are reviewed with regard to cause factors. Marginal weather appears to be the one most significant factor contribution to low-level, high-speed accidents; however, several human factors such as visual contrast problems, fatigue, stress, reaction time, 'mission completion' syndrome, inattention and task overload were identified. Aspects of accidents which typify human factors problems are described. Suggested possible preventive measures are outlined. (Author)

1C. Aircraft

AD-A075 814/4 PC **A04**/MF **A01**
Naval Air Development Center Warminster PA Aircraft and Crew Systems Technology Directorate
Design and Test of a Boron - Aluminum High Temperature Wing.
Final rept.,
R. J. Richey, Jr. , and T. E. Hess. 31 May 79, 58p Rept no. NADC-79145-60

The feasibility of utilizing the high buckling stability characteristics of boron - aluminum advanced composite material in a simple, low-cost spar-rib-skin construction for a thin airfoil structure was investigated for high temperature application up to 589 degrees K. The design concept developed consists of boron-aluminum skins, to carry the primary bending and torsion loads, mechanically fastened to a light gage steel sub-structure, which resists transverse shear and stabilizes the skins. The viability of the concept depends on whether this stabilization of the skin material can be accomplished with a practical number and spacing of substructure elements. A weight saving of one third in comparison to the production article is projected in this boron-aluminum version of the BYM-34E wing. A major wing subcomponent was fabricated and static tested to validate the structural adequacy of the overall design. (Author)

AD-A075 860/7 PC **A02**/MF **A01**
Wright Air Development Center Wright-Patterson AFB Oh
Footrests on Upward Ejection Seats.
Technical rept.,
Walter S. Rothwell. Sep 52, 22p Rept no. WADC-TR-52-208

Tests were conducted to determine the importance of footrests on ejection seats, using a 100 foot vertical ejectionseat test tower and a mock-up

which simulated the control wheel, instrument panel and rudder pedals of the B-47B pilot's position. The paths followed by the toes and knees during ejection were varied by changing the catapult, size and weight of shoe and position of the leg at the time of ejection. Three principle test conditions were studied: a. Footrests removed, feet extended on rudder bar. b. Footrests removed, feet retracted against seat. c. Footrests in place, feet extended on rudder bar. Results were recorded by (a) high speed motion pictures (b) accelerometers placed on the man's hip and on the seat, and (c) time and distance magnet displacement ot measure velocity. The subject was briefly examined before and after each test.

AD-A075 866/4 PC **A04**/MF **A01**
Wright Air Development Center Wright-Patterson AFB Oh
A Method for Evaluating Aircraft Stability Parameters from Flight Test Data.
Memorandum rept.,
Lloyd E. Schumacher. Jun 52, 53p Rept no. WADC-TR-52-71

A least-squares method for evaluating aircraft stability derivaties and transfer function constants from flight test frequency response data is derived. The normalized least-squares equations for rotating vectors are derived by minimizing the sum of the squares of the residual vectors without regard to the phase angles of these residuals. This method was applied to longitudinal oscillation data obtained from flight tests of a USAF bomber-type B-25J aircraft. It is shown that a linear dependency in the longitudinal variables of motion must be resolved before any solution can be obtained. The assumption of a linear relationship between the stability derivatives for the forces or moments resulting from the rate of change of the angle of attack and the pitching velocity eliminated this dependency and gave acceptable results. The lift caused by pitching velocity must be included in order to obtain a reasonable value for the lift resulting from elevator deflection.

AD-A075 868/0 PC **A02**/MF **A01**
Wright Air Development Center Wright-Patterson AFB Oh
An Investigation of the Problem of Ice Removal from B-29 Radomes.
Technical rept.,
Harry G. Lake. Jan 52, 25p Rept no. WADC-TR-52-46

This report disseminates information on the problems of removing ice or preventing its formation B-29 radomes. Each system described herein was investigated for its effectiveness as a means of deicing and for its effect on electrical transmission of radar equipment. Three possible solutions ar presented: the use of chemical coatings; fluid spray deicing: and the rubber deicer boot. The advantages and disadvantages of each system are discussed. The tests which were conducted indicated that the systems developed and presented were adequate. However, it should be understood that these systems are but temporary solutions and work will continue until better methods can be evolved. (Author)

AD-A075 871/4 PC **A03**/MF **A01**
Wright Air Development Center Wright-Patterson AFB Oh
Equations of Motion of the F-80 Aileron Boost.
Memorandum rept.,
Samuel P. Altman. Mar 52, 44p Rept no. WADC-TR-52-43

Equations and non-linear expressions defining the dynamic control performance of the F-80 aircraft aileron boost are derived. The complete equations and expressions define the non-linear nature of the device, and relate the instantaneous input and output moments to the input and output positions respectively, as determined by the boost design. Methods of solution by analogue machine methods are indicated for further investigation and study. These equations and expressions may be of use also in analysis of F-94 roll performance, since the boost design (with the exception of the hydraulic system pressure) is similar. The operation of the F-80 aileron differential mechanism is described as a related factor in the overall roll system control by a human pilot. (Author)

AD-A075 884/7 PC **A05**/MF **A01**
Cornell Univ Ithaca N Y Graduate School of Aerospace Engineering
The Aerodynamics of Supersonic Biplanes of Finite Span.
Technical rept.,
H. S. Tan. Dec 50, 84p WADC-TR-52-276
Contract AF 33(038)-9832

Linearized supersonic-flow theory is employed to evaluate the lift and drag of biplane cellules having the 'Busemann-biplane configuration. The lift and drag are explicitly expressed as functions of thickness ratio and the angle of attack; the coefficients involved are universal for all Busemann biplane. Interpretation of the results for various Mach numbers is afforded by a similarity rule. Most of the results are presented graphically. It is found that the wave drag due to thickness of finite-span Busemann biplanes is small. (Author)

AD-A075 949/8 PC **A12**/MF **A01**
Lockheed-California Co Burbank
General Aviation Airplane Structural Crashworthiness User's Manual. Volume II - Input-Output Techniques and Applications. Revision.
Final rept. Jun 76-Feb 78,
Max A. Gamon , Gil Wittlin , and William L. LaBarge. Sep 79, 253p LR-28307-VOL-2, FAA/RD-77/189-V2-REV
Contract DOT-FA75WA-3707
Supersedes report dated Feb 78, AD-A054 317.
See also Volume 3, AD-A054 266.

Program KRASH has several features which can be used effectively to evaluate crashworthiness capability of vehicles during the initial stages of a design. Conceptually the program is designed to define the general behavior of structure and to provide data which can be utilized to assess chances of occupant survivability during a severe crash environment. While KRASH currently contains one measure of injury potential (Dynamic Response Index, DRI), the data obtained from KRASH are more useful as input to more complex seat-occupant-restraint system models. Since the program utilizes simplified and approximate representations of structure, it best can be described as a preliminary design tool.

AD-A075 980/3 MF **A01**
Wright Air Development Center Wright-Patterson AFB Oh
Electric Motor Whirl Test of a Flottorp Standard Two-Blade Propeller and a Flottorp Standard Two-Blade Propeller Incorporating Nemeth Modified Leading Edge (Whirl Test No. 2355).
Technical rept.,
Nathan Showers. Aug 52, 24p Rept no. WADC-TR-52-190
Availability: Microfiche copies only.

The electric motor whirl test of a Flottorp 'standard' two blade, six ft. diameter, wood, fixed-pitch propeller was conducted. An electric motor whirl test was then conducted on a similar 'standard' Flottorp propeller that had been modified along the leading edge by the Nemeth Aeronautic! Laboratory, Chicago, Illinois. The modification consisted of a series of smooth indentations, in wave form, from about the 0.3 radius out the tip of the blade. It was claimed by Nemeth Aeronautical Laboratory that such modifications would increase thrust produced at any given horsepower and rpm condition. Test data are presented covering static calibration of the two propellers for comparative purposes. Calibration consisted fo the measurement of the values of the thrust produced and horsepower absorbed at various rpm. Results of the tests were inconclusive. (Author)

AD-A075 983/7 PC **A04**/MF **A01**
Wright Air Development Center Wright-Patterson AFB Oh
Development of Fixed Two-Way Restrictor Valves for Use on Military Aircraft.
Technical rept.,
Ralph L. Vick. Jul 52, 63p Rept no. WADC-TR-52-153

Standardization of a fixed two-way 3000 psi restrictor valve, which would be reasonably independent of fluid viscosity changes, was the main object of the development. All tests were conducted at the Wright Air Development Center by the Hydraulics and Pneumatics Section of the Mechanical Branch of the Aircraft Laboratory. The tests and development resulted in an orifice type restrictor valve with protective filters for .067 inch diameter orifices and smaller and a restrictor valve without filters for orifices above .067 diameter. A range of interchangeable standard orifice diameters is a feature of the new valve design. For optimum standardization, it is recommended that one type assembly be used, with unions or adaptors as applicable, for the small orifices needing filters and a larger size type for the larger orifices, not requiring filters. (Author)

AD-A075 990/2 PC **A05**/MF **A01**
Wright Air Development Center Wright-Patterson AFB Oh
Propeller Performance at Zero Forward Speed.
Technical rept.,
Dana A. Webb , and Jack E. Willer. Jul 52, 84p Rept no. WADC-TR-52-152

Static thrust data from propeller whirl tests at Wright-Patterson Air Force Base, and several other sources, on numerous propellers are analyzed and correction factors are derived which correlate these data. Standard curves for static thrust are given for 2, 3, and 4-bladed single rotation propellers, and for 6 and 8-bladed dual-rotation propellers. These standard curves, together with the correction factors, are used to predict the static shaft thrust of any conventional propeller to within about 5%. With the exception of a two-bladed Clark-Y propeller curve, all standard curves are for propellers utilizing MACA 16-series airfoil sections. (Author)

AD-A075 997/7 PC **A04**/MF **A01**
Wright Air Development Center Wright-Patterson AFB Oh
Autogeneous Electrification of a B-45A Aircraft. Part 1. Preliminary Investigation.
Technical rept.,
Carl A. Barbelt. Dec 51, 55p Rept no. WADC-TR-52-34-PT-1
See also Part 2, AD-001 155.

The problem of precipitation static is becoming increasingly severe with present-day high-speed aircraft. The use of large transparent plastic surfaces with various antenna mounted under the plastic surface accentuates the problem. A B-45A type aircraft was instrumented to measure the electrostatic condition of the aircraft and the canopies in flight. Eleven flights have been made through atmospheric conditions varying from clear air to high-altitude snow and ice cyrstals at temperatures of -20 to -40 C. Tentative conclusions reached are that precipitation static generated on the canopy is serious. Instrumentation problems for research on electrification of canopies have been resolved, and quantitative evaluation of surface treatments to reduce canopy precipitation static may now be accomplished. The electrostatic characteristics of the aircraft as a whole have been determined over a very limited range of magnitudes. (Author)

AD-A075 999/3 PC **A11**/MF **A01**
Pioneer Parachute Co Inc Manchester Conn
Investigation of Impact Load Absorption through Suspension Line Elongation.
Technical rept.,
E. A. Gimalouski. Dec 52, 236p WADC-TR-52-57
Contract AF 33(038)-10401

The purpose of this investigation was the study of suspension lines under actual operating conditions, having varying degrees of elongation, energy absorption and elasticity. A secondary purpose of the investigation was the study of fabric porosity, shape and type of canopy, and method of parachute deployment. The shock absorbing capacity of five different types of parachute suspension line cord were first evaluated for basic physical properties, then were tested by assembling into parachutes and opening the parachute at various speeds - first at 100 mph, then 150 mph, finally 200 mph - on a whirling test tower. The parachutes were evaluated first in standard back type, then in deployment bag openings. Two types of parachutes were used: one being a twenty four foot standard parachute, the other being a 30 foot parachute, with an extended skirt. The loads were measured and the cords evaluated on the basis of shock absorbing capacity, strength, and durability. Final results of the work indicates that the present-

ly used 550 lb tensile strength cord, Specification MIL-C-5040, Type III, is the best of the cords evaluated. A good correlation was established between line energy absorption and snatch force, but opening shock loads appear to be little affected by line characteristics. (Author)

AD-A076 040/5 PC **A05**/MF **A01**
Wright Air Development Center Wright-Patterson AFB Oh
An Approximate Method for the Calculation of Nonstationary Air Forces at Subsonic Speeds.
Technical rept.,
Henry E. Fettis. Mar 52, 90p Rept no. WADC-TR-52-56

The present report explains and illustrates a method of computing the non-stationary forces and moments on an oscillating airfoil at subsonic speeds. The process is based on the well known Possio integral equation relating the pressure on the airfoil to the normal velocity. Part I of the report contains the theoretical development which leads to the required equations for determining the lift and moment. In Part II the method of Part I is applied to the computation of the aerodynamic lift and moment coefficients for four principal degrees of freedom of the airfoil.

AD-A076 043/9 PC **A05**/MF **A01**
Cornell Aeronautical Lab Inc Buffalo N Y
Investigation of Discrepancies between Flight-Measured and Calculated F-80A Derivatives and Responses Including a Study of Aeroelastic Effects.
Technical rept.,
Leonard Segel. Aug 52, 80p CAL-TB-495-F-14, WADC-TR-52-130
Contract W33(038)-ac-17003

Studies have been made to determine if discrepancies existing between calculated and measured tail loads, responses, and derivatives, as obtained for the F-80A, can be eliminated or explained. These discrepancies were evidenced as (1) a tail load smaller than that predicted, (2) the measured aerodynamic stiffness being significantly greater than that indicated by wind tunnel tests, and (3) an unreasonably large value of stabilizer effectiveness being obtained in the analysis of the flight data. Certain of these results indicated that investigations should be made to establish the manner in which aeroelasticity and unsteady flow aerodynamics influence the tail loads and rigid body response of the F-80A airplane. It was found that (a) the failure of measured tail loads to agree with calculations is primarily due to an error in measurement due to limitations in strain gage location, (b) the effect of aeroelasticity is small and not of a dynamic nature, (c) the lack of agreement between predicted and measured responses at low Mach numbers is due to prediction being based on a wind tunnel evaluation of tail-off static stability which was different from that obtained in flight, and (d) the stabilizer effectiveness and downwash cannot be accurately evaluated unless the tail-off damping in pitch is determined.

AD-A076 050/4 PC **A06**/MF **A01**
Balco Research Labs Newark Nj
Development of Transparent Materials Which Reduce Effects of Precipitation Static in Aircraft.
Technical rept.,
M. U. Cohen, and George A. Dalin. Mar 52, 109p WADC-TR-52-36
Contract AF 33(038)-12240

Methods of laying a transparent electrically conductive film on plastic airplane canopies are discussed. The purpose of such films is to conduct to the aircraft frame the static charges developed on the canopies by friction with air, dust, snow, etc., during flight. Unless these charges are properly dissipated, precipitation static results, producing serious interference with radio communication. The types of film studied include metal oxides, metals, phosphors, polyelectrolytes, electrolytes dispersed in waxes, and electrolytes dispersed in non-polar polymers. Special techniques employed in the research include film-forming by withdrawing slides from solution at a controlled rate, vacuum-evaporation of metals, metallic oxides and phosphors, a convenient method of measuring surface resistance, and the deposition from solution of adherent metal-oxide films on acrylic sheet. Preliminary studies indicate that the monobutyl ester of orthophosphoric acid in polymethyl methacrylate and analogous systems merit further detailed investigation. (Author)

AD-A076 058/7 PC **A03**/MF **A01**
Wright Air Development Center Wright-Patterson AFB Oh
Phase V (All Weather) Testing of T-29A Aircraft.
Memorandum rept.,
Oakley W. Baron. Apr 52, 34p Rept no. WADC-TR-52-68

Flight tests were conducted on T-29A Aircraft at Wright-Patterson Air Force Base, to evaluate the aircraft for all-weather flying capabilities. All flying was accomplished by personnel of the All Weather Section, Flight Test Division. Data were gathered on operation of the aircraft from take-off to landing under simulated and actual instrument conditions to determine the feasibility of instrument flight and to recommend instrument flight techniques to be incorporated in the Handbook of Flight Operating Instructions. The aircraft was found to be satisfactory for all-weather operations except for restrictions imposed by freezing precipitation during take-off or severe icing at cruising altitude. (Author)

AD-A076 230/2 Not available NTIS
Defence Research Establishment Ottawa (Ontario)
Nickel-Cadmium Aircraft Battery Failure Prediction,
K. Feldman , R. L. Haines , and R. Hayashi.
1976, 3p Rept no. DREO-739
Availability: Pub. in Annual Proceedings Power Sources Conference (27th), Secondary Batteries Session, Jun 76 3p (No copies furnished by DTIC).

No abstract available.

N80-10101/7 PC **A04**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
Effect of Winglets on a First-Generation Jet Transport Wing. 6: Stability Characteristics for a Full-Span Model at Subsonic Speeds.
S. G. Flechner. Oct 79, 69p NASA-TP-1330, L-12514

A wind tunnel investigation to identify changes in stability and control characteristics of a model KC-135A due to the addition of winglets is presented. Static longitudinal and lateral-directional aerodynamic characteristics were determined for the model with and without winglets. Variations in the aerodynamic characteristics at various Mach numbers, angles of attack, and angles of slidslip are discussed. The effect of the winglets on the drag and lift coefficients are evaluated and the low speed and high speed characteristics of the model are reported.

N80-10102/5 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
Wind-Tunnel Investigation of the Validity of a Sonic-Boom-Minimization Concept.
R. J. Mack, and C. M. Darden. Oct 79, 47p NASA-TP-1421, L-12661

The Langley unitary plan unitary plan wind tunnel was used to determine the validity of a sonic-boom-minimization theory. Five models - two reference and three low-boom constrained - were tested at design Mach numbers of 1.5 and 2.7. Results show that the pressure signatures generated by the low-boom models had significantly lower overpressure levels than those produced by the reference models and that small changes in the Mach number and/or the lift caused relatively small changes in the signature shape and overpressure level. Boundary-layer effects were found in the signature shape and overpressure level. Boundary-layer effects were found to be sizable on the low-boom models, and when viscous corrections were included in the analysis, improved agreement between the predicted and the measured signatures was noted. Since this agreement was better at Mach 1.5 than at Mach 2.7, it was concluded that the minimization method was definitely valid at Mach 1.5 and was probably valid at Mach 2.7, with further work needed to resolve the uncertainty.

N80-10104/1 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Washington, D. C.
The Significance of Wing End Configuration in Airfoil Design for Civil Aviation Aircraft.
H. Zimmer. Oct 79, 35p NASA-TM-75711, PAPER-77-030
Contract NASW-3199
Tran-Transl. Into English of "Die Bedeutung der Fluecelendformen Tragfluecelentwurf fuer Flugzeuge der Zivilen Luftfahrt", Paper-77-030 Deutsche Gesellschaft fuer Luft-und Raumfahrt, Jahrestagung 10TH, Berlin, 15 Sep. 1977 40 p. Subm-Transl. By Leo Kanner Associates, Redwood City, Calif.

Lift-dependent induced drag in commercial aviation aircraft is discussed, with emphasis on the necessary compromises between wing and configuration modifications which better lift performance and the weight gains accompanying such modifications. Triangular, rectangular and elliptical configurations for wing ends are considered; attention is also given to airfoil designs incorporating winglets. Water tunnel tests of several configurations are reported. In addition, applications of wing and modifications to advanced technology commercial aviation aircraft and the Airbus A-300 are mentioned.

N80-10106/6 PC **A08**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
Effect of Several Airframe/Nozzle Modifications on the Drag of a Variable-Sweep Bomber Configuration.
R. J. Re, and D. E. Reubush. 1979, 171p NASA-TM-80129, L-13043

A variable sweep bomber aircraft model was investigated to identify modifications for drag reduction. Modifications included simulated two dimensional nozzles, staggered and extended nozzles; short, long, and no interfairings between the nozzles; partial and complete wing-glove fairings; glove-fuselage sidefairing; fuselage underfairing; and wing pods. The variable wing sweep and variable exhaust nozzles of the scale model are discussed.

N80-10107/4 PC **A22**/MF **A01**
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
Workshop on Thrust Augmenting Ejectors.
A. E. Lopez, D. G. Koenig, D. S. Green, and K. S. Nagaraja. Sep 79, 509p NASA-CP-2093, A-7887 Conf-Conf. Held at Moffett Field, Calif., 28-29 Jun. 1978; Sponsored by Nadc and AFFDL.

No abstract available.

N80-10137/1 PC **A02**/MF **A01**
Michigan Univ., Ann Arbor. Dept. of Aerospace Engineering.
Math Modeling and Computer Mechanization for Real Time Simulation of Rotary-Wing Aircraft.
Final Report, 1 Jun. 1977 - 31 Mar. 1979.
R. M. Howe. Mar 79, 21p NASA-CR-162400
Grant NSG-2245

Mathematical modeling and computer mechanization for real time simulation of rotary wing aircraft is discussed. Error analysis in the digital simulation of dynamic systems, such as rotary wing aircraft is described. The method for digital simulation of nonlinearities with discontinuities, such as exist in typical flight control systems and rotor blade hinges, is discussed.

N80-10148/8 PC **A13**/MF **A01**
Northwestern Univ., Evanston, Ill. Transportation Center.
Factors Affecting the Retirement of Commercial Transport Jet Aircraft.
F. A. Spencer. Aug 79, 296p NASA-CR-152308
Grant NSG-2149

The historical background of the technology and economics of aircraft replacement and retirement in the prejet era is reviewed in order to determine whether useful insights can be obtained applicable

to the jet era. Significant differences between the two periods are noted. New factors are identified and examined. Topics discussed include concern over current policies regarding deregulation, regulatory reform, and retroactive noise regulations; financing and compliance legislation; aging; economic environment and inflation; technological progress; fuel efficiency and cost; and a financial perspective of replacement decisions.

N80-10149/6 PC **A12**/MF **A01**
Douglas Aircraft Co., Inc., Long Beach, Calif.
Cargo Logistics Airlift Systems Study (Class). Volume 4: Future Requirements of Dedicated Freighter Aircraft to Year 2008.
R. J. Burby. Oct 79, 259p NASA-CR-158950-V-4
Contract NAS1-14948

The 1978 fleet operations are extended to the year 1992, thus providing an evaluation of current aircraft types in meeting the ensuing increased market demand. Possible changes in the fleet mix and the resulting economic situation are defined in terms of the number of units of each type aircraft and the resulting growth in operational frequency. Among the economic parameters considered are the associated investment required by the airline, the return on investment to the airline, and the accompanying levels of cash flow and operating income. Against this background the potential for a derivative aircraft to enter fleet operations in 1985 is defined as a function of payload size and as affected by 1980 technology. In a similar manner, the size and potential for a new dedicated 1990 technology, freighter aircraft to become operational in 1995 is established. The resulting aircraft and fleet operational and economic characteristics are evaluated over the period 1994 to 2008. The impacts of restricted growth in operational frequency, reduced market demand, variations in aircraft configurations, and military participation, are assessed.

N80-10193/4 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
Experiments in Sensing Transient Rotational Acceleration Cues on a Flight Simulator.
R. V. Parrish. Oct 79, 24p NASA-TP-1537, L-13030

Results are presented for two transient motion sensing experiments which were motivated by the identification of an anomalous roll cue (a 'jerk' attributed to an acceleration spike) in a prior investigation of realistic fighter motion simulation. The experimental results suggest the consideration of several issues for motion washout and challenge current sensory system modeling efforts. Although no sensory modeling effort is made it is argued that such models must incorporate the ability to handle transient inputs of short duration (some of which are less than the accepted latency times for sensing), and must represent separate channels for rotational acceleration and velocity sensing.

N80-10195/9 PC **A18**/MF **A01**
Teledyne Ryan Aeronautical Co., San Diego, Calif.
Study of the Feasibility Aspects of Flight Testing an Aeroelastically Tailored Forward Swept Research Wing on a BQM-34F Drone Vehicle.
D. J. Mourey. 3 Sep 79, 409p NASA-CR-159149
Contract NAS1-15624

The aspects of flight testing an aeroelastically tailored forward swept research wing on a BQM-34F drone vehicle are examined. The geometry of a forward swept wing, which is incorporated into the BQM-34F to maintain satisfactory flight performance, stability, and control is defined. A preliminary design of the aeroelastically tailored forward swept wing is presented.

N80-10225/4 PC **A04**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
Comparison of Stability and Control Parameters for a Light, Single-Engine, High-Winged Aircraft Using Different Flight Test and Parameter Estimation Techniques.
W. T. Suit, and R. L. Cannaday. Sep 79, 54p NASA-TM-80163

The longitudinal and lateral stability and control parameters for a high wing, general aviation, airplane are examined. Estimations using flight data obtained at various flight conditions within the normal range of the aircraft are presented. The estimations techniques, an output error technique (maximum likelihood) and an equation error technique (linear regression), are presented. The longitudinal static parameters are estimated from climbing, descending, and quasi steady state flight data. The lateral excitations involve a combination of rudder and ailerons. The sensitivity of the aircraft modes of motion to variations in the parameter estimates are discussed.

N80-10460/7 PC **A06**/MF **A01**
Battelle Columbus Labs., Ohio.
Spray Nozzle Designs for Agricultural Aviation Applications.
Final Report, Oct. 1978 - Sep. 1979.
K. W. Lee, A. A. Putnam, J. A. Gieseke, M. N. Golovin, and J. A. Hale. 18 Sep 79, 105p NASA-CR-159702
Contract NAS3-21581

Techniques of generating monodisperse sprays and information concerning chemical liquids used in agricultural aviation are surveyed. The periodic dispersion of liquid jet, the spinning disk method, and ultrasonic atomization are the techniques discussed. Conceptually designed spray nozzles for generating monodisperse sprays are assessed. These are based on the classification of the drops using centrifugal force, on using two opposing liquid laden air jets, and on operating a spinning disk at an overloaded flow. Performance requirements for the designs are described and estimates of the operational characteristics are presented.

N80-10512/5 PC **A05**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
Light Airplane Crash Tests at Three Roll Angles.
C. B. Castle, and E. Alfaro-bou. Oct 79, 77p NASA-TP-1477, L-12778

Three similar twin engine general aviation airplanes were crash tested at the Langley impact dynamics research facility at 27 m/sec and at nominal roll angles of 0 deg, -15 deg, and -30 deg. Other flight parameters were held constant. The test facility, instrumentation, test specimens, and test method are briefly described. Structural damage and accelerometer data for each of the three impact conditions are presented and discussed.

N80-10516/6 PC **A05**/MF **A01**
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
Coupled Rotor and Fuselage Equations of Motion.
W. Warmbrodt. Oct 79, 82p NASA-TM-81153

The governing equations of motion of a helicopter rotor coupled to a rigid body fuselage are derived. A consistent formulation is used to derive nonlinear periodic coefficient equations of motion which are used to study coupled rotor/fuselage dynamics in forward flight. Rotor/fuselage coupling is documented and the importance of an ordering scheme in deriving nonlinear equations of motion is reviewed. The nature of the final equations and the use of multiblade coordinates are discussed.

PB80-802119 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Remotely Piloted Vehicles. Volume 2. November, 1975-November, 1979 (A Bibliography with Abstracts).
Rept. for Nov 75-Nov 79,
Guy E. Habercom, Jr. Dec 79, 270p
Supersedes NTIS/PS-78/1246, NTIS/PS-77/1143, NTIS/PS-76/1034 and NTIS/PS-75/876. See also Volume 1, 1964-October, 1975, NTIS/PS-76/1033.

Operation of vehicles under remote guidance and control is investigated in these Government-sponsored research reports. Aircraft, drones, and extraterrestrial explorers are among the areas researched. (This updated bibliography contains 262 abstracts, 35 of which are new entries to the previous edition.)

1D. Aircraft Flight Control and Instrumentation

AD-A076 021/5 PC **A12**/MF **A01**
Honeywell Systems and Research Center Minneapolis Mn
Digital Flight Control Software Validation Study.
Final rept. Apr 78-Apr 79,
Edward R. Rang , Michael J. Gutmann , Dennis B. Mulcare , and William G. Ness. Jun 79, 261p 79SRC18, AFFDL-TR-79-3076
Contract F33615-78-C-3605

The problems of designing, verifying, and validating software for digital flight control systems are reviewed to study how the new software engineering tools and techniques may be incorporated into the development process. This shows how automated methodologies will provide error-free flight control software at lower costs. The need for expensive, lengthy test programs is reduced by analytical methods. The quality of the software is demonstrated with higher confidence when designs are structured to facilitate the subsequent verification steps. The military standards relating to flight control systems are reviewed, and modifications to include provisions for software verification are recommended. (Author)

AD-A076 153/6 PC **A04**/MF **A01**
Army Electronics Research and Development Command Wsmr Nm Atmospheric Sciences Lab
Helicopter Remote Wind Sensor System Description.
Research and development technical rept.,
David H. Dickson , and Charles M. Sonnenschein. Sep 79, 57p Rept no. ERADCOM/ASL-TR-0040

The helicopter remote wind sensor (HRWS) is an application of a laser Doppler velocimeter. This system description describes the HRWS fabricated by Raytheon Company for the US Army Atmospheric Sciences Laboratory. The HRWS was designed to measure wind fields in an aircraft turbulent environment. The operational emphasis is to augment an attack helicopter's fire control system. This CO2 laser heterodyne system remotely measures three dimensional winds from 1 to 33 meters in front of the sensor. The HRWS was mounted in an external pod compatible with AH-1, AAH and UH-1 wing stores or a fixed wing aircraft equipped with standard wing shackles. The HRWS theory, functions, and subsystem are discussed. Data from flight and ground testing will be presented in a later report. (Author)

N80-10224/7 PC **A07**/MF **A01**
Delco Electronics, Santa Barbara, Calif.
Electromechanical Flight Control Actuator.
Final Report.
Feb 79, 129p NASA-CR-160348, R79-2
Contract NAS9-14952

The feasibility of using an electromechanical actuator (EMA) as the primary flight control equipment in aerospace flight is examined. The EMA motor design is presented utilizing improved permanent magnet materials. The necessary equipment to complete a single channel EMA using the single channel power electronics breadboard is reported. The design and development of an improved rotor position sensor/tachometer is investigated.

1E. Air Facilities

AD-A075 922/5 PC **A07**/MF **A01**
National Oceanic and Atmospheric Administration Boulder Colo Wave Propagation Lab
A Thunderstorm Gust-Front Detection System. Part I. System Operation and Significant Case Studies. Part II. Statistical Results.
Summary rept. Oct 76-Apr 79,
A. J. Bedard, Jr. , F. H. Merrem , D. Simms , and M. M. Cairns. Aug 79, 147p FAA-RD-79-55
Contract DOT-FA76WAI-622

The Dulles International Airport wind and wind shear detection system recorded more than 160 events from November 1976 through March 1978. Eighty-two percent of 113 significant events occurred in conjunction with thunderstorms, squall-

lines and frontal passages. The chief source of false alarms for anemometers was boundary layer disturbances representing 10% of the total; while gravity shear waves related to the 500mb winds caused the most false alarms for pressure sensors (4% of the total). Using complementary arrays of wind and pressure sensors, total system false alarms can be greatly reduced. These data demonstrate the importance of stable surface layers in determining how well surface temperature and wind measurements represent flow at higher levels and explain underestimates of system severity. Moreover, because we demonstrate the value of wind vector information and since temperature is a scaler quantity, there seems little operational value in using temperature sensors as part of a detection system. Conversely, pressure sensors will not reliably detect relatively thin outflows (100-200 M thick) occurring at a distance from downflows having small dimensions. Again, the wind and pressure sensors combine to provide a total system offering good reliability for detection of thunderstorm outflows. The results suggest an array configuration (composed of wind and pressure jump sensors) for use in airport warning systems. This configuration extending about 10km from the airport provides a warning for Thunderstorm gust-fronts.

AD-A076 253/4 PC **A05**/MF **A01**
Boeing Wichita Co Ks
Jet Engine Demountable Test Cell Exhaust System Phase - Coanda/Refraction Noise Suppression Concept - Advanced Development.
Technical rept. Jul-Dec 76,
R. E. Ballard , W. F. Byers , and D. L. Armstrong.
Apr 79, 91p D3-11527-1, NAEC-92-112
Contract N00140-76-C-1229

The successfully demonstrated Coanda/refraction air-cooled exhaust noise suppressor system is applied to the Navy requirement for effective exhaust noise suppression in jet engine demountable test cells. The technical approach consists of analytical studies and one-sixth scale model tests using simulated afterburning engine exhaust. Revisions are made to the previously developed system to improve noise suppression capability while reducing the system overall size and initial cost. Revisions include moving secondary air inlets to reduce enclosure size and improve cooling, shortening the Coanda surface to provide more acoustically treated exhaust stack and providing variations in exhaust stack configuration such as single and dual acoustic splitters and acoustic wedges up the back wall. Extensive data were recorded and analyzed to identify the aerothermodynamic and acoustic trends related to these configuration changes. Results present recommendations for an air-cooled Coanda/refraction exhaust system for application to demountable test cells. (Author)

2. AGRICULTURE

2A. Agricultural Chemistry

DOE/TIC-10170 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Nuclear Fuel Cycle Information Workshop: U From H sub 3 PO sub 4.
F. J. Hurst. 1979, 22p
Contract W-7405-ENG-26

This paper describes how phosphate fertilizers are made, how uranium is recovered, and how to detect uranium recovery operations in a phosphate plant. 10 figures. (ERA citation 04:049530)

2C. Agricultural Engineering

COO-4094-33 PC **A04**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Design Optimization and Performance Characteristics of a Photovoltaic Microirrigation System for Use in Developing Countries.
R. W. Matlin. 10 Jul 79, 66p
Contract EY-76-C-02-4094

Tens of millions of the world's poorest farmers currently subsist on small farms below two hectares in size. The increasing cost of animal irrigation coupled with decreasing farm size and the lack of a utility grid or acceptable alternate power sources is causing interest in the use of solar photovoltaics for these very small (subkilowatt) water pumping systems. The attractive combinations of system components (array, pump, motor, storage and controls) have been identified and their interactions characterized in order to optimize overall system efficiency. Computer simulations as well as component tests were made of systems utilizing flat-plate and low-concentration arrays, direct-coupled and electronic-impedance-matching controls, fixed and incremental (once or twice a day) tracking, dc and ac motors, and positive-displacement, centrifugal and vertical turbine pumps. The results of these analyses and tests are presented, including water volume pumped as a function of time of day and year, for the locations of Orissa, India and Cairo, Egypt. Finally, a description and operational data are given for a prototype unit that was developed as a result of the previous analyses and tests. (ERA citation 04:054319)

COO-4094-43 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Performance of the Mead, Nebraska, 25 KWp Photovoltaic Solar Energy System and Comparison with Simulation.
L. L. Bucciarelli, and R. F. Hopkinson. 1979, 6p
CONF-790803-41
Contract EY-76-C-02-4094
14. intersociety energy conversion conference, Boston, MA, USA, 5 Aug 1979.

A photovoltaic solar energy system has been providing power for irrigation and crop drying at an agricultural field station of the University of Nebraska. The system, developed and maintained jointly by MIT/Lincoln Laboratory and the University and under contract to the US Department of Energy, consists of a 25 kWp PV array, a battery subsystem, an inverter, a controller, and a data collection and management system. Field data indicate that the PV array performs up to expectations if allowance is made for degradation. The array operates at an efficiency (based on cell area) of between 7 and 8%; the battery subsystem at an in-out efficiency of 83%, and the inverter at 87%. During the irrigation season the system delivers 70% of the energy provided by the PV array to the pump motor. Approximately 10% of the array energy is wasted when the battery is in a fully charged state and the array power exceeds the load. Performance of the system was compared with the results of a computer simulation. This comparison showed agreement to within +- 5% on daily energy totals for array output, inverter input, battery input and output. (ERA citation 04:054321)

COO-4094-49 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
PV-Powered Microirrigation Systems.
R. W. Matlin. 1979, 5p CONF-790541-48
Contract EY-76-C-02-4094
International Solar Energy Society meeting, Atlanta, GA, USA, 28 May 1979.

Tens of millions of farmers currently subsist on small farms below two hectares in size. The increasing cost of animal irrigation coupled with decreasing farm size and the lack of a utility grid or acceptable alternate power sources is causing interest in the use of solar photovoltaic for these very small (subkilowatt) water pumping systems. The attractive combinations of system components (array, pump, motor, storage, and controls) have been identified and their interactions characterized in order to optimize overall system efficiency. Computer simulations as well as component tests were made of systems utilizing flat plate and low concentration arrays, direct-coupled and electronic impedance matching controls, fixed and incremental (once or twice a day) tracking, dc and ac motors, and positive displacement, centrifugal and verticle turbine pumps. The results of these analyses and tests are presented for Orissa, India and Cairo, Egypt, and include water volume pumped as a function of time of day and year. Finally, a description and operational data is given for the prototype unit that was developed as a result of the previous analyses and tests. (ERA citation 04:054323)

2D. Agronomy and Horticulture

PAT-APPL-6-043 976 PC **A02**/MF **A01**
Department of Agriculture, Washington, DC.
Rotating Field Plot Row Marker.
Patent Application,
David L. Cobb, Brian L. Doyle, James A. Webster, and David H. Smith, Jr. Filed 30 May 79, 9p PB80-114804
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention relates to an agricultural row marking apparatus of the type that makes impressions in the earth to assist in the placement of seeds or seedlings during planting. It is equipped with both transverse and longitudinal imprinting projections which impresses a grid-type pattern into the soil for precise placement of seeds or seedlings in a subsequent planting operation.

PATENT-4 166 107 Not available NTIS
Department of Agriculture, Washington, DC.
Sustained Release Bolus Formulations Containing Insect Growth Regulators for Control of Livestock Pests.
Patent,
John A. Miller, Murray L. Beadles, and Roger O. Drummond. Filed 25 Jul 78, patented 28 Aug 79, 4p PB80-100969, PAT-APPL-927 791
Supersedes PB-289 036.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Compositions of insect regulators comprising monostearin, carnuba wax, barium sulfate, methoprene, and diflubenzuron are selectively formulated into a sustained-release bolus and orally administered to livestock to control the larvacidal activity of arthropods in the manure of the livestock.

2F. Forestry

PB80-110745 PC **A03**/MF **A01**
Water Resources Council, Washington, DC.
Nationwide Analysis. Appendix F. Designated and Potential Wilderness Areas.
Jun 76, 29p
See also PB80-110752.

The Nationwide Analysis was conducted by the Water Resource Council's member agencies and reflects their viewpoints about the existing and future water and related land requirements. The report lists designated wilderness areas as of July 1, 1976, by water resources aggregated subareas.

SLU-IEM-73-1978 PC **A02**/MF **A01**
Sveriges Lantbruksuniversitet, Uppsala. Inst. foer Ekologi och Miljoevaard.
Tree Biomass in Some Scots Pine Stands.
A. Albrektsson. 1978, 22p
In Swedish.
U.S. Sales Only.

The biomass of the tree layer was estimated in a number of pine stands (Pinus silvestris L.) in northern Gaestrikland, Sweden. These investigations formed part of the Swedish Coniferous Forest Project. The stands were growing under similar conditions, and were selected so as to form an age sequence. Biomass was estimated by destructive sampling of trees. The dry weights of the following fractions per hectare are given: roots > 30 mm diameter, stumps, stems, branches, and dead branches. (ERA citation 04:048306)

SLU-IEM-79-1978 PC **A03**/MF **A01**
Sveriges Lantbruksuniversitet, Uppsala. Inst. foer Ekologi och Miljoevaard.
Biomass in an Old Mixed Conferous Forest in Dalarna, Sweden.
A. Albrektsson, and B. Andersson. 1978, 43p
In Swedish.
U.S. Sales Only.

An analysis is given of tree biomass in a mixed stand of pine (Pinus silvestris) and spruce (Picea abies) in middle Sweden. The described stand is on one of the experimental sites that are intensive-

ly studied in the Swedish Coniferous Forest Project. (ERA citation 04:049653)

3. ASTRONOMY AND ASTROPHYSICS

3A. Astronomy

N80-10978/8 PC **A04**/MF **A01**
Steward Observatory, Tucson, Ariz.
Near Infrared Photographic Sky Survey. 1: Catalog of Red Stellar Objects.
E. R. Craine, R. E. Duerr, V. M. Horner, C. L. Imhoff, and D. E. Routsis. Aug 79, 73p NASA-CR-162386, CONTRIB-SER-A-3
Subm-Sponsored by NASA and NSF.

Red stellar objects for which V-1 was greater than a value of about 2 (supm). 5 were extracted from photographs of 23 program fields. Tabular data for each field show the object name; the 1950 epoch right ascension, declination, galactic longitude, galactic latitude; radial distance from field venter in decimal degrees; color classes; and objects ordered by redness.

3B. Astrophysics

AD-A075 845/8 Not available NTIS
Iowa Univ Iowa City Dept of Physics and Astronomy
High-Resolution Spectrograms of Ion Acoustic Waves in the Solar,
W. S. Kurth , D. A. Gurnett , and F. L. Scarf. 2 May 78, 7p
Contracts NASA-9-54013, NAS1-13129
Availability: Pub. in Jnl. of Geophysical Research, v84 nA7 p3413-3419, 1 Jul 79 (No copies furnished by DTIC).

No abstract available.

AD-A075 850/8 Not available NTIS
Iowa Univ Iowa City Dept of Physics and Astronomy
Propagation of a Forbush Decrease in Cosmic Ray Intensity to 15.9 AU,
J. A. Van Allen. 30 Mar 79, 3p
Contract NAS2-6553
Availability: Pub. in Geophysical Research Letters, v6 n7 p566-568 Jul 79 (No copies furnished by DTIC).

No abstract available.

AD-A076 255/9 PC **A10**/MF **A01**
Aerospace Corp El Segundo Ca Lab Operations
CRLS-229 Solar X-Ray Spectrometer/Spectroheliograph Experiment.
Interim rept.,
P. B. Landecker , W. T. Chater , C. K. Howey , D. L. McKenzie , and H. R. Rugge. 5 Oct 79, 206p TR-0080(5960-01)-1, SAMSO-TR-79-76
Contract F04701-79-C-0080

The CRLS-229 Solar X-ray Spectrometer/Spectroheliograph was launched in the solar pointed section of the United States Air Force Space Test Program P78-1 satellite on 24 February 1979. The SOLEX collimated Bragg crystal spectrometer experiment and the MONEX solar X-ray monitor experiment were built by The Aerospace Corporation, and the Naval Research Laboratory supplied the SOLFLEX uncollimated solar flare crystal spectrometer and the MAGMAP magnesium mapping experiment. The SOLEX A spectrometer has a 20 arc sec multigrid collimator, an ADP or RAP crystal, and proportional counter detector with a 25 micrometers thick beryllium window. The SOLEX B spectrometer has a 60 arc sec collimator, an ADP or RAP crystal, and a channel electron multiplier array detector. The SOLEX crystals and detectors can be driven so that either spectrometer exposes RAP to the collimated solar X-rays while the other exposes ADP. The spacecraft pointing system can raster the SOLEX collimator over the whole sum or a 5 x 5 arc minute region to build up a monochromatic image, or it can point the instrument anywhere on the sun so that spectra in the 3-25 angstroms range are obtained.

BNL-26380 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Broken Symmetries at High Temperatures and the Problem of Baryon Excess of the Universe.
R. N. Mohapatra, and G. Senjanovic. Jun 79, 24p CONF-790642-1
Contract EY-76-C-02-0016
International conference on high energy physics, Geneva, Switzerland, 27 Jun 1979.

A class of gauge theories, where spontaneously broken symmetries, instead of being restored, persist as the temperature is increased is discussed. A renormalization group analysis of this phenomena suggests that there may be more than one phase transition in these models with at least one symmetric phase. Applying these ideas to the specific case of soft CP-violation in grand unified theories, a mechanism to generate the baryon to entropy ratio of the universe is discussed. 34 references. (ERA citation 04:050650)

LBL-8920 PC **A02**/MF **A01**
California Univ., Berkeley. Space Sciences Lab.
Measurement of the Isotopic Composition of Galactic Cosmic Ray Carbon, Nitrogen and Oxygen.
M. E. Wiedenbeck, D. E. Greiner, F. S. Bieser, H. J. Crawford, and H. H. Heckman. Jun 79, 8p CONF-790836-3
Contract W-7405-ENG-48
16. international cosmic rays conference, Kyoto, Japan, 6 Aug 1979.

The results of an investigation of the isotopic composition of galactic cosmic ray carbon, nitrogen and oxygen (E approx. 80 to 230 MeV/amu) made using the U.C. Berkeley HKH instrument aboard the ISEE-3 spacecraft are reported. The combination of high mass resolution and a large statistical sample makes possible a precise determination of the relative isotopic abundances for these elements. In local interplanetary space we find: exp 13 C/C = 0.067 +- 0.008, exp 15 N/N = 0.54 +- 0.03, exp 17 O/O < 0.027, and exp 18 O/O = 0.019 +- 0.003. (ERA citation 04:050642)

N80-10239/5 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
Pioneer Saturn Encounter.
Sep 79, 29p NASA-TM-80807
Misc-Original Contains Color Illustrations.

The Pioneer Saturn Spacecraft, which began its journey as Pioneer 11, provided the first close view of the rings of Saturn as well as its system of moons. Its payload of 11 operating instruments obtained or confirmed data about the mass, temperature, composition, radiation belts, and atmosphere of the planet and its larger satellite, Titan. It made photometric and polarization measurements of Iapetus, Rhea, Dione, and Tethys, as well as discovered additional rings. Scientific highlights of the mission are summarized. Color imagery provided by the photopolarimeter is included along with illustrations of the planet's magnetic field and radiation belts.

N80-10478/9 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, D. C.
Experimental Study of the Vidicon System for Information Recording Using the Wide-Gap Spark Chamber of gamma - Telescope gamma-I.
V. V. Akimov, R. Bazer-bashv, S. A. Voronov, A. M. Galper, and M. Gro. Sep 79, 19p NASA-TM-75644, PR-436
Contract NASW-3198
Tran-Transl. Into English of "Eksperimental'Noye Issledovaniye Vidikonnoy Sistemy Dlya S'Yema Informatsii S Shirokozazornykh Iskrovykh Kamer gamma-Telescopa 'Gamma-I'", Rept. Pr-436 Acad. Of Sci. Ussr, Inst. Of Space Res., Moscow, 1978 p 1-22. Subm-Transl. By Scientific Translation Service, Santa Barbara, Calif.

The development of the gamma ray telescope is investigated. The wide gap spark chambers, used to identify the gamma quanta and to determine the directions of their arrival, are examined. Two systems of information recording with the spark chambers photographic and vidicon system are compared.

N80-10908/5 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, D. C.
Temperature Deformations of the Mirror of a Radio Telescope Antenna.
V. I. Avdeyev, S. A. Grach, K. K. Kozhakhmetov, and F. I. Kostenko. Jun 79, 15p NASA-TM-75633, PR-412
Tran-Transl. Into English of "Temperaturnyye Deformatsil Sostavnogo Zerkala Antenny Radioteleskopa", Rept. Pr-412 Acad. Of Sci. Ussr, Inst. Of Space Res., Moscow, 1978 p 1-19. Subm-Transl by Scientific Translation Service, Santa Barbara, Calif.

The stress informed state of the mirror of an antenna, with a diameter of 3 m, for a radio interferometer used in space, and located in a temperature field is examined. The mirror represents a parabolic shell, consisting of 19 identical parts. The problem is based on representations of the thermoelasticity of thin shells.

N80-10979/6 PC **A04**/MF **A01**
Cornell Univ., Ithaca, N. Y. Center for Radiophysics and Space Research.
Stellar Convection 2: A Multi-Mode Numerical Solution for Convection in Spheres.
P. S. Marcus. Nov 79, 63p NASA-CR-162252, CRSR-731
Contracts NGR-33-010-186, NSF ATM-76-10424

The convective flow of a self gravitating sphere of Boussinesq fluid for small Reynolds and Peclet numbers is numerically determined. The decomposition of the equations of motion into modes is reviewed and a relaxation method is developed and presented to compute the solutions to these equations. The stable equilibrium flow for a Rayleigh number of 10 to the 4th power and a Prandtl number of 10 is determined. The 2 and 3 dimensional spectra of the kinetic and thermal energies and the convective flux as a function of wavelengths are calculated in terms of modes. The anisotropy of the flow as a function of wavelength is defined.

N80-10980/4 PC **A04**/MF **A01**
Cornell Univ., Ithaca, N. Y. Center for Radiophysics and Space Research.
Stellar Convection 3: Convection at Large Rayleigh Numbers.
P. S. Marcus. Nov 79, 54p NASA-CR-162253, CRSR-732
Contracts NGR-33-010-186, NSF ATM-76-10424

A three dimensional study of convection in a self gravitating sphere of Boussinesq fluid with a Rayleigh number of 10 to the 10th power and a Prandtl of 1 is presented. The velocity and temperature of the fluid are computed at the largest wavelengths using spectral methods. A confirmation that the fluid is anisotropic and that the energy spectra are not smooth functions of wavelength but have a large amount of fine structure is discussed. The parameterization of the transport properties of the unresolvable inertial subrange with eddy viscosities and diffusivities is described. The time dependent fluctuations in the energy spectra and how they cascade from large to small wavelengths is examined.

N80-10981/2 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Washington, D. C.
Non-Equilibrium Processes in Interstellar Molecules.
V. S. Strelnitskiy. Oct 79, 27p NASA-TM-75685, PR-462
Contract NASW-3198
Tran-Transl. Into English of Neravnovesniye Protessy V Mezhzvezdnykh Molekuiah (Moscow), PR-462, 1979 30 p. Subm-Transl. By Scientific Translation Service, Santa Barbara, Calif. Original Document Prepared by Academy of Sciences (Ussr), Moscow.

The types of nonequilibrium emission and absorption by interstellar molecules are summarized. The observed brightness emission temperatures of compact OH and H2O sources are discussed using the concept of maser amplification. A single thermodynamic approach was used in which masers and anti-masers are considered as heat engines for the theoretical interpretation of the cosmic maser and anti-maser phenomena. The requirements for different models of pumping are formulated and a classification is suggested for the

mechanisms of pumping, according to the source and discharge of energy.

N80-10982/0 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Washington, D. C.
Propagation of Waves in a Medium with High Radiation Pressure.
G. S. Bisnovatyy-kogan, and S. I. Blinnikov. Oct 79, 40p NASA-TM-75679, PR-421
Contract NASW-3198
Tran-Transl. Into English of Rasprostraneniye Voln V Srede S Vysokim Luchistym Davleniem (Moscow), PR-421, 1978 45 p. Misc-Original Language Document Announced as A79-39378. Subm-Transl. By Scientific Translation Service, Santa Barbara, Calif. Original Document Prepared by Academy of Sciences (Ussr), Moscow.

The propagation and mutual transformation of acoustic and thermal waves are investigated in media with a high radiative pressure. The equations of hydrodynamics for matter and the radiative transfer equations in a moving medium in the Eddington approximation are used in the investigation. Model problems of waves in a homogeneous medium with an abrupt jump in opacity and in a medium of variable opacity are presented. The characteristic and the times of variability are discussed. Amplitude for the brightness fluctuations for very massive stars are discussed.

N80-10983/8 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Washington, D. C.
Hydrodynamics of Primordial Black Hole Formation.
D. K. Nadezhin, I. D. Novikov, and A. G. Polnarev. Oct 79, 31p NASA-TM-75918, PR-347
Contract NASW-3199
Tran-Transl. Into English of "Gidrodinamika Obrazovaniya Pervichnikh Chyernykh Dyr", Rept. Pr-347 Acad. Of Sci. Ussr, Inst. Of Space Res., Moscow, 1979 p 1-36. Misc-Original Language Document Was Announced as A79-16307. Subm-Transl. By Leo Kanner Associates, Redwood City, Calif.

The hydrodynamic picture of the formation of primordial black holes (PBH) at the early stages of expansion of the Universe is considered. It is assumed that close to singularity, expansion occurs in a quasi-isotropic way. Using an EVM, a spherically symmetrical nonlinear problem of the evolution of primary strong deviation from the Fridman solution was solved. What these deviations must be, so that the formation of PBH occurred was clarified. Attention was devoted to the role of pressure gradients. It is pointed out that at the moment of formation of PBH, only a small part of matter enters into it, primarily the component of perturbation. It is also pointed out that at this moment, the mass of PBH essentially is smaller than the mass considered within the cosmic horizon. The possibility of changing the mass of the PBH as a result of accretion is analyzed.

N80-10986/1 PC **A04**/MF **A01**
Planetary Science Inst., Pasadena, Calif.
Lunar Radar Backscatter Studies.
Final Report, 15 Jul. - 14 Oct. 1978.
T. W. Thompson. 19 Oct 79, 51p NASA-CR-162415, REPT-5-420-71-780-09
Contract NASW-3205

The lunar surface material in the Plato area is characterized using Earth based visual, infrared, and radar signatures. Radar scattering in the lunar regolith with an existing optical scattering computer program is modeled. Mapping with 1 to 2 km resolution of the Moon using a 70 cm Arecibo radar is presented.

N80-10988/7 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Washington, D. C.
Results and Interpretation of Measurements of the Light Flux in the Near-Surface Layer of the Venusian Atmosphere.
Y. M. Golovin, B. Y. Moshkin, and A. P. E. Ekonomov. Oct 79, 48p NASA-TM-75716, PR-338
Contract NASW-3199
Tran-Transl. Into English of Rexul'Taty I Interpretatsiya Izmereniy Svetovykh Potokov V Pripoverkhnostnom Sloye Atmosfery Venery (Moscow), PR-338, 1977 40 p. Subm-Transl. By Kanner (Leo) Associates, Redwood City, Calif. Original Document Prepared by Academy of Sciences (Ussr), Moscow.

The characteristics of the field of radiation in the near surface layer of the atmosphere and on the surface of Venus are reported. Optical measurements made during the landing of the descent vehicles are described. The relief of the surface and the amount of dust on it are examined. The spectral relationship of the albedo of the soil and the light flux incident on the surface is discussed.

N80-10989/5 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, D. C.
On the Structure of the Upper Atmosphere of Mars According to Data from Experiments on the Viking Space Vehicles.
M. N. Izakov. Oct 79, 21p NASA-TM-75717, PR-343
Contract NASW-3198
Tran-Transl. Into English from O Strukture Verkhney Atmosfery Marsa Po Dannym Eksperimentov NA Kosmicheskikh Apparatakh Viking (Moscow), PR-343, 1977 p 1-19. Misc-Original Language Document Announced as A79-18856. Subm-Transl. By Scientific Translation Service, Santa Barbara, Calif. Original Document Prepared by Academy of Sciences (Ussr), Moscow.

Altitude profiles of the concentrations of the atmospheric components measured by the on board mass spectrometers during the descent of Viking lander are discussed by assuming that temperature has a smoother profile, and the eddy mixing coefficients are smaller at altitudes of 120 to 170 km than those formally determined. The influence of acoustic gravitational waves and errors in measurements and calculations are discussed in relation to the convolutions in the altitude profiles of the concentrations of the atmospheric components and the temperature of the atmosphere.

N80-10990/3 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, D. C.
Numerical Modeling of Stimulation of Induced Magnetosphere During Interaction of Solar Wind with the Ionosphere of Venus.
A. S. Lipatov. Oct 79, 25p NASA-TM-75921, PR-351
Contract NASW-3198
Tran-Transl. Into English of "Chislennoye Modelirovaniye Vozbuzhdenia Indutsirovannoy Magnitosfery Pri Pri Vzaimodeystvii Solnechnogo Vetra S Ionosferoy Venery", Rept. Pr-351 USSR Academy of Sciences, Inst. Of Cosmic Research, Moscow, 1977 p 1-24. Subm-Transl. By Scientific Translation Service, Santa Barbara, Calif.

Electrodynamic processes in the ionopause are examined as well as the structure of the induced magnetosphere.

N80-10991/1 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, D. C.
Algorithms for Locating Celestial Sources of X-Rays and gamma Flares with the Aid of Several Spacecraft.
G. A. Mersov. Oct 79, 15p NASA-TM-75920, PR-344
Contract NASW-3199
Tran-Transl. Into English of "Algoritmy Lokalizatsii Nebesnykh Istochnikov Rentgenovskikhi gamma-Vspleskov S Pomoshch' Yu Neskol' Kikh Ksmicheskikh Apparatov", Rept. Pr-344 USSR Academy of Sciences, Inst. Of Space Research, Moscow, 1977 p 1-14. Subm-Transl. By Kanner (Leo) Associates, Redwood City, Calif.

An Algorithm is suggested for defining the coordinants of X-ray and Gamma Ray radiation sources by measuring the time lag of the transmission of radiation flares from various points of space in which spacecraft are located. Instances are cited where the 2-x, 3-x and 4x spacecraft are used.

4. ATMOSPHERIC SCIENCES

4A. Atmospheric Physics

AD-A075 653/6 MF **A01**
Naval Research Lab Washington Dc
Proceedings of the Symposium on the Effect of the Ionosphere on Space and Terrestrial Systems (1978) Held on January 24 - 26 1978.
1978, 522p
Availability: Superintendent of Documents, GPO, Washington, DC 20402 HC$12.75 Microfiche furnished to DTIC (and NTIS) users.

Contents: Radiowave Scintillation: Experiments and Mitigation Schemes; Radiowave Scintillation: In Situ Measurements, Modeling and Channel Simulation; Radio Noise and Radiowave Propagation between Elf and HF; Spacecraft Charging and Space/Microwave Interactions; Forecasting Studies and Ionospheric Modification; and Ionospheric Effects: Ranging and Navigation Systems.

AD-A075 748/4 PC **A09**/MF **A01**
Aerospace Corp El Segundo Ca Space Sciences Lab
A Survey of Currently Important Empirical Thermospheric Models.
Interim rept.,
David R. Hickman , Barbara K. Ching , Carl J. Rice , Lawrence R. Sharp , and Joe M. Straus.
14 Sep 79, 189p TR-0079(4960-04)-2, SAMSO-TR-79-57
Contract F04701-78-C-0079

A description of currently important empiriccal thermospheric models is given, and the relative advantages of each are discussed. In addition, a comprehensive set of contour plots of total density is presented to allow more detailed examination of quantitative aspects of the models. (Author)

AD-A075 919/1 PC **A02**/MF **A01**
Aerospace Corp El Segundo Ca Space Sciences Lab
A Simple Model of the Magnetosphere.
Interim rept.,
Janet M. Luhmann , and Lynn M. Friesen. 12 Sep 79, 24p TR-0079(4960-05)-6, SAMSO-TR-79-95
Contract F04701-78-C-0079

A phenomenological magnetic field model for the earth's magnetosphere is constructed from a dipole field and a uniform field directed sunward in the northern hemisphere and antisunward in the southern hemisphere. The properties of this simple model are compared with those of several other quantitative models. The present models is found to be more suitable for calculations than some other simple models in cases where the distant(>13 Re) magnetotail configuration is important. Moreover, this model is easily adaptable to changes in the field geometry and to the description of magnetotail asymmetries. (Author)

AD-A076 018/1 PC **A06**/MF **A01**
Pennsylvania State Univ University Park
A High Speed Digital Autocorrelator and Its Application to Mesospheric Water Vapor Detection.
Technical rept.,
P. T. Petruno , and John J. Olivero. Jul 79, 125p ERADCOM/ASL-CR-79-0083-1
Grant DAAG29-78-G-0083

The emission and absorption spectrum of stratospheric and mesospheric water vapor are to be detected and analyzed. In both cases the method of detection requires a 22 GHz radiometer, and the data analysis requires a high speed, high resolution spectral analyzer. The basic radiometer fundamentals are discussed here, then the various techniques of spectral analysis are considered, which include both digital and analog versions of filter banks and autocorrelators. A prototype 2 x 1 bit digital autocorrelator was then designed and constructed. The system was designed to operate at a sampling rate of up to 100 MHz, with a resolution dependent on the number of autocorrelation points used. The system was then interfaced to a Nova 1200 minicomputer for data accumulation and transfer of data to nine track magnetic tape for

standard processing. An IBM 370 computer system was available for final data reduction and analysis. The final system was a 16 point autocorrelator, two points of which were constructed. Future goals include completing the 16 points and using the system for a ground based measurement of upper atmosphere water vapor. (Author)

AD-A076 238/5 PC **A02**/MF **A01**
Air Force Geophysics Lab Hanscom AFB Ma
Postsunrise Refilling of the Low-Latitude Topside Ionosphere,
W. J. Burke , R. C. Sagalyn , R. G. Rastogi , M. Ahmed , and F. J. Rich. 8 Jan 78, 8p Rept no. AFGL-TR-79-0232
Pub. in Jnl. of Geophysical Research, v84 nA8 p4201-4206, 1 Aug 79. Prepared in cooperation with Boston Coll., Chestnut Hill, MA. and Regis Coll. Research Center, Weston, MA.

No abstract available.

AD-A076 267/4 PC **A12**/MF **A01**
Ohio State Univ Columbus Electroscience Lab
Tropospheric Water Vapor Absorption in the Infrared Window Regions.
Doctoral thesis,
Michael E. Thomas. Aug 79, 251p ESL-784701-5, ARO-14702.4-GS
Contract DAAG29-77-C-0010

Attenuation of infrared radiation in the troposphere is dominated by water vapor absorption. Most past work on the spectroscopy of water vapor has been on the analysis of the rotational and vibrational bands. As a result a thorough listing of line positions, line strengths and halfwidths exists today. Because of the weak 'continuum' absorption in the water vapor windows centered at 10 and 4 microns, efforts to measure and model the continuum have not been as successful as efforts in the analysis of the bands. Yet a precise understanding of continuum absorption is important for long path energy transmission. The purpose of this study is to demonstrate the importance of far wing phenomena in characterizing H2O continuum absorption. A total line shape for water vapor-nitrogen interactions valid under tropospheric conditions is derived. The model is tested using a set of experimental room temperature H2O continuum measurements of high quality. Using this data base parameters of the far wing component of the total line shape are determined.

COO-1199-55 PC **A02**/MF **A01**
Illinois State Water Survey, Urbana.
Precipitation Chemistry Trends in the Northeastern United States.
G. J. Stensland. 1979, 19p CONF-790573-2
Contract EY-76-S-02-1199
12. University of Rochester symposium on environmental toxicity: polluted rain, Rochester, NY, USA, 21 May 1979.

Historical trends of the concentrations of the various trace substances in precipitation can serve as an indication of the changes in the levels of these substances in the air. Three topics related to the precipitation chemistry data base for the United States are examined. First, since the pH of precipitation is of major interest, techniques to calculate this quantity are considered. Next, the changes in the precipitation chemistry for a central Illinois site are discussed. This site is at the western edge of present high atmospheric sulfate levels, and thus it is interesting to examine changes in the precipitation pH at this site and the reasons for them. Changes in the sulfate and nitrate at this central Illinois site and other sites further East are also discussed, and these changes are compared to the time trends in the anthropogenic source emissions. Results suggest that at present the best approach to calculating the pH of a precipitation sample is to assume that a charge balance exists and then to apply an empirical correction. With this approach the 1977 central Illinois samples are shown to be much more acid than those from 1954. The primary reason for this pH decrease is the decreased concentration of calcium and magnesium in the samples. For the mid-1970's compared to the mid-1950's the source emissions estimates for the United States were up by a factor of 1.3 for sulfur and 2.1 for nitrogen. During this same time interval the sulfate concentrations for the precipitation chemistry sites in the northeastern United States remained about the same and the nitrate concentrations increased by factors varying from 1.3 to 1.8. Since the emissions estimates increased more than the precipitation concentrations, it would seem that a smaller fraction of the pollutants were being removed over the northeast by wet processes in the mid-1970's than in the mid-1950's. (ERA citation 04:052139)

EPRI-EA-886-SR PC **A02**/MF **A01**
Stanford Univ., CA.
Modification of Local Weather by Power Plant Operation. Final Report.
J. Laurmann. Aug 78, 17p

Power plant operation can affect weather as a result of emissions of effluents and from release of waste heat. Effluents can cause acid rain and impaired visibility. The release of waste heat can affect weather by changing local meteorology in a manner which stimulates an otherwise inactive convective instability. In general, however, the energy from waste heat from a conventional power plant is far less than that needed to trigger such events as thunderstorms or cyclones. Large power parks (upwards of 10,000 MWe), however, do have the potential for causing thunderstorms. Small power plants have an energy output comparable to that of a tornado but the heat rise is too buoyant to develop the vorticity needed for tornadoes. Much research is needed in gathering field data and in developing three-dimensional models for describing latent atmospheric instabilities. In view of the low probability of conventional power plants causing significant weather changes, and in view of the comprehensive research program on inadvertent weather modification by the Department of Energy, no additional EPRI research effort is needed at this time. (ERA citation 04:026230)

INIS-mf-4898 PC **A05**/MF **A01**
Amsterdam Univ. (Netherlands).
Partial Ring Currents and Cosmic Ray Magnetic Cutoff Rigidity Variations.
M. Arens. 4 Oct 78, 96p
Proefschrift (Dr.).
U.S. Sales Only.

A short introduction on cosmic ray modulation and a description of the magnetosphere and of some physical processes occurring within its boundaries are presented. 20 geomagnetic storms are analyzed together with the cosmic ray intensities during these storms as measured by neutron monitors. By a semi-empirical method, the variations in the magnetic cutoff rigidity for the mountain stations Pic du Midi and Jungfraujoch are deduced. These stations are the most sensitive for measuring these variations. The analysis shows that all analyzed storms have an asymmetric development phase. Often the asymmetry even continues during part of the recovery phase. It is shown that variations in magnetic cutoff rigidity occur only during the asymmetric phase of the storm. The largest variations are found when the cosmic ray station is located in the late afternoon-midnight sector. (Atomindex citation 10:452014)

PAT-APPL-6-078 612 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Pasadena Office, CA.
Microwave Limb Sounder.
Patent Application,
J. J. Gustincic. Filed 24 Sep 79, 21p N79-34014/7, NASA-CASE-NPO-14544-1
Contract JPL-954492
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A microwave limb sounder (MLS) to measure trace gases in the upper atmosphere by comparing spectral noise content of limb soundings with the spectral noise content of cold space is disclosed. The sounder utilizes an offset Cassegrain antenna system and a tiltable input mirror to alternately look out at the limb and up at cold space at an elevation angle of about 22 deg. Reflection from the mirror is directed into a radiometer which functions as a diplexer to combine the input radiation and a local oscillator (klystron) beam. The radiometer head is comprised of a Fabry-Perot resonator consisting of two Fabry-Perot cavities spaced a number of half wavelengths apart. Incoming radiation received on one side is reflected and rotated 90 deg in polarization by the resonator so that it will be reflected by an input grid into a mixer, while the klystron beam received on the other side is also reflected and rotated 90 deg.

4B. Meteorology

AD-A075 954/8 PC **A03**/MF **A01**
Meteorology International Inc Monterey Calif
The Upper-Air Analysis Capability, FIB/UA introducing Weighted Spreading.
Final rept.,
Manfred M. Holl. Jun 76, 40p Rept no. MII-M-213
Contract N00228-75-C-2374

The Fields by Information Blending (FIB) methodology, based on fundamental and generalized information-processing concepts, is a comprehensive technique for the analysis of scalar and vector fields with a wide range of realized and potential applications. In general such applications lead to a system of linear equations which normally is too big to permit solution by explicit matrix inversion. Hitherto the sole recourse for solution of such systems has been to Successive Over-Relaxation (SOR) techniques which require a first-guess solution and also converge at an undesirably slow rate. This Report details the development of a new technique, termed Blending by Weighted Spreading, for producing an effective solution to the system of linear equations arising from FIB applications. This technique, described in the context of its initial application in an MII-developed upper air analysis system (FIBUA), produces an effective solution to the system of linear equations which converges far more rapidly than SOR schemes alone and, of particular note, no first-guess solution is required. It is expected that all future FIB-based analysis systems, where appropriate, will utilize the new technique--Blending by Weighted Spreading. (Author)

AD-A075 978/7 PC **A04**/MF **A01**
Army Electronics Research and Development Command Wsmr Nm Atmospheric Sciences Lab
Precipitation Estimation Using Satellite Data.
Technical rept.,
Bruce T. Miers. Sep 79, 57p Rept no. ERADCOM/ASL-TR-0039

This report attempts to show that, by fitting particular nonlinear auto-covariance and cross-covariance functions to space-time covariance values calculated from satellite data, convective complex characteristics such as size, ellipticity, motion, growth, and decay of a storm can be determined. These modeled features then can be related to convective storm characteristics found by Scofield and Oliver. In turn, these characteristics are related to actual rainfall amounts. The results of this study are a first step in removing the subjectivity from current rainfall estimation techniques. Results from the 20 May 1977 storm over Texas and Oklahoma are presented. (Author)

AD-A076 011/6 PC **A03**/MF **A01**
Army Electronics Research and Development Command Fort Monmouth Nj Night Vision and Electro-Optics Labs
Design Approach for the Visioceilometer AN/GMQ-( )(XE-1).
Final rept.,
Henry Saphow , Frederick Kobylarz , Gunther Kainz , and Earl Griggs. Sep 79, 38p Rept no. DELNV-TR-79-4

This report details the in-house efforts to design, fabricate and test a combination visiometer/ceilometer based upon Laser Rangefinding and CCD technologies. The effort described demonstrated concept feasibility and offers recommendations for implementing future generation equipment. (Author)

AD-A076 070/2 MF **A01**
Air Force Environmental Technical Applications Center Scott AFB Il
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F. Fort Huachuca, Huachuca City, Arizonia.
Final rept.
20 Aug 79, 513p Rept no. USAFETAC/DS-79/068

Availability: Microfiche copies only.

This report is a six-part statistical summary of surface weather observations for Fort Huachuca, Huachuca City, Arizona. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A076 071/0 MF **A01**
Air Force Environmental Technical Applications Center Scott AFB Il
Clinton Co AFB, Wilmington, Ohio. Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F.
Final rept.
12 Aug 70, 320p Rept no. USAFETAC/DS-79/075
Availability: Microfiche copies only.

This report is a six-part statistical summary of surface weather observations for Clinton Co AFB, Wilmington, Ohio. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A076 072/8 PC **A17**/MF **A01**
Air Force Environmental Technical Applications Center Scott AFB Il
Seattle FWS, Washington. Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F.
Final rept.
28 Aug 70, 387p Rept no. USAFETAC/DS-79/076

This report is a six-part statistical summary of surface weather observations for Seattle FWC, Washington. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A076 073/6 PC **A16**/MF **A01**
Air Force Environmental Technical Applications Center Scott AFB Il
John Rodgers WBAS, Honolulu, Hawaii. Revised Uniform Summary of Surface Weather Observations (RUSSWO), Parts A-F.
Final rept.
5 Dec 67, 364p Rept no. USAFETAC/DS-79/079

This report is a six-part statistical summary of surface weather observations for John Rodgers WBAS, HI. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A076 074/4 PC **A21**/MF **A01**
Air Force Environmental Technical Applications Center Scott AFB Il
Andrews AFB, Washington, District of Columbia. Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F.
Final rept.
14 Mar 74, 491p Rept no. USAFETAC/DS-79-080

This report is a six-part statistical summary of surface weather observations for Andrews AFB, Washington, District of Columbia. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A076 075/1 PC **A22**/MF **A01**
Air Force Environmental Technical Applications Center Scott AFB Il
Michales AAF, Dugway, Utah. Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A - F.
Final rept.
21 Mar 74, 510p Rept no. USAFETAC/DS-79/081

This report is a six-part statistical summary of surface weather observations for Michales AAF, Dugway, Utah. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A076 076/9 PC **A21**/MF **A01**
Air Force Environmental Technical Applications Center Scott AFB Il
Chanute AFB, Rantoul, Illinois. Revised Uniform Summary of Surfae Weather Observations (RUSSWO). Parts A-F.
Final rept.
27 Oct 72, 477p Rept no. USAFETAC/DS-79/082

This report is a six-part statistical summary of surface weather observations for Chanute AFB, Rantoul, Illinois. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A076 077/7 PC **A14**/MF **A01**
Air Force Environmental Technical Applications Center Scott AFB Il
James Connally AFB, Waco, Texas. Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F.
Final rept.
1 Nov 65, 320p Rept no. USAFETAC/DS-79/083

This report is a six-part statistical summary of surface weather observations for James Connally AFB, Waco, Texas. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures andrelative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A076 078/5 PC **A19**/MF **A01**
Air Force Environmental Technical Applications Center Scott AFB Il
Fritzsche AAF, Fort Ord, Salinas, California. Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F.
Final rept.
17 Feb 72, 426p Rept no. USAFETAC/DS-79/084

This report is a six-part statistical summary of surface weather observations for Fort Ord, Salinas, California. It contains the following parts: (A) Weather conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A076 079/3 PC **A20**/MF **A01**
Air Force Environmental Technical Applications Center Scott AFB Il
Gray AAF, Fort Lewis, Lacey, Washington. Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F.
Final rept.
23 Feb 79, 462p Rept no. USAFETAC/DS-79-085

This report is a six-part statistical summary of surface weather observations for Fort Lewis, Lacey, Washington. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psych-

rometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A076 080/1 PC **A21**/MF **A01**
Air Force Environmental Technical Applications Center Scott AFB Il
Fort Sill AAF, Lawton, Oklahoma. Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F.
Final rept.
19 Sep 79, 480p Rept no. USAFETAC/DS-79/086

This report is a six-part statistical summary of surface weather observations for Fort Sill AAF, Lawton, Oklahoma. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A076 081/9 PC **A21**/MF **A01**
Air Force Environmental Technical Applications Center Scott AFB Il
Craig AFB, Selma, Alabama. Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F.
Final rept.
15 Jun 76, 485p Rept no. USAFETAC/DS-79/087

This report is a six-part statistical summary of surface weather observations for Craig AFB, Selma, Alabama. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A076 082/7 PC **A22**/MF **A01**
Air Force Environmental Technical Applications Center Scott AFB Il
Norton AFB, San Bernardino, California. Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F.
Final rept.
8 Jan 74, 507p Rept no. USAFETAC/DS-79/070

This report is a six-part statistical summary of surface weather observations for Norton AFB, San Bernardino, California. It contains the followig parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A076 083/5 PC **A20**/MF **A01**
Air Force Environmental Technical Applications Center Scott AFB Il
Langley AFB, Newport News, Virginia. Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F.
Final rept.
1 Jun 79, 475p

This report is a six-part statistical summary of surface weather observations for Langley AFB, Newport News, Virginia. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A076 084/3 PC **A22**/MF **A01**
Air Force Environmental Technical Applications Center Scott AFB Il
Buckley Field ANG, Aurora, Colorado. Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F.
Final rept.
9 Mar 72, 502p Rept no. USAFETAC/DS-79/072

This report is a six-part statistical summary of surface weather observations for Buckley FLD ANG, AURORA, Colorado. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A076 085/0 PC **A21**/MF **A01**
Air Force Environmental Technical Applications Center Scott AFB Il
Elmendorf AFB, Anchorage, Alaska. Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F.
Final rept.
17 Sep 79, 476p Rept no. USAFETAC/DS-79/071

This report is a six-part statistical summary of surface weather observations for Elmendorf AFB, Anchorage, Alaska. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A076 086/8 PC **A21**/MF **A01**
Air Force Environmental Technical Applications Center Scott AFB Il
Fort Leavenworth, Fort Leavenworth, Kansas. Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F.
Final rept.
20 Jun 75, 496p Rept no. USAFETAC/DS-79/073

This report is a six-part statistical summary of surface weather observations for Forth Leavenworth, KS. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A076 087/6 PC **A21**/MF **A01**
Air Force Environmental Technical Applications Center Scott AFB Il
Galena WB, Galena, Alaska. Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F.
Final rept.
22 Sep 76, 497p Rept no. USAFETAC/DS-79/074

This report is a six-part statistical summary of surface weather observations for Galena WB, Alaska. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A076 088/4 PC **A14**/MF **A01**
Air Force Environmental Technical Applications Center Scott AFB Il
Sewart AFB, Smyrna, Tennessee. Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F.
Final rept.
10 Jul 67, 324p

This report is a six-part statistical summary of surface weather observations for Sewart AFB, Smyrna, Tennessee. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in

tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A076 089/2 PC **A14**/MF **A01**
Air Force Environmental Technical Applications Center Scott AFB Il
Hunter Liggett AAF, Jolon, California. Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F.
Final rept.
23 Oct 67, 307p

This report is a six-part statistical summary of surface weather observations for Jolon, Hunter Liggett AAF, California. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B)Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A076 164/3 MF **A01**
Florida State Univ Tallahassee Dept of Statistics
A Multivariate Methodology for the Analysis of Weather Modification Experiments.
Technical rept.,
Elton Scott. Aug 79, 72p Rept nos. FSU-STATISTICS-M514, TR-147-ONR
Contract N00014-76-C-0394
Availability: Microfiche copies only.

This paper develops applications of multivariate statistical models, particularly principal component analysis, to the analysis of data from weather modification experiments. The efficacy of these multivariate applications is examined by applying the proposed models to data from Phase I of the Santa Barbara Convective Band Seeding Program conducted for the Navy by North American Weather Consultants. Multivariate summary measures of precipitation are developed and multivariate methods are given to analyze the effects of cloud-seeding on precipitation. Results from these models, based on the above-mentioned data set, are reported along with conclusions and suggestions for further work. An appendix provides detailed summary statistics for the analyses. (Author)

AD-A076 190/8 PC **A06**/MF **A01**
Army Command and General Staff Coll Fort Leavenworth Ks
Probability Weather Forecasts: For the Army.
Final rept.,
Arthur C. Kyle. 8 Jun 79, 116p
Master's thesis.

The United States Army presently receives weather forecasts expressed in categorical terms. However, this forecast form limits the useful information that can be communicated to the decision maker. This study investigates the utility of replacing categorical forecasts with probability forecasts in order to enhance decision making by Army commanders. To this end, the advantages and limitations of probability forecasts are reviewed. The principal conclusion of this study is that Army commanders would benefit from receiving probability weather forecasts. Finally, several recommendations for smoothing the conversion are given and a briefing that a Staff Weather Officer can use as a basis for showing an Army commander the utility of probability forecasts is provided. (Author)

AD-A076 256/7 PC **A04**/MF **A01**
Oklahoma Univ Norman
Dynamical Analysis of Mediterranean Cyclogenesis.
Final rept.,
Yoshi K. Sasaki , and John McGinley. Sep 79, 54p NEPRF-CR-79-04
Contract N00228-77-C-3055

Variational calculus methods were developed to study storm development in regions of high terrain. Budget calculations of kinetic energy, latent heat energy and vorticity were made for two cases of a cold front passing over the Alps and into the Mediterranean Sea. The analysis scheme accurately depicted the synoptically significant features while producing relatively small residuals in the budget computations. The results show that kinetic energy in the lower layers was correlated wih terrain roughness, where kinetic energy seemed to be damped by mountains. Adiabatic heating in the region of the lee slopes acted to weaken the front while adiabatic cooling in the region of the windward slopes acted to strengthen the front. The increase in moisture condensation in the upslope region acted to slow and intensify the frontal system. These analyses were used to develop a schematic model of the effect of high terrain on frontal movement and intensity. (Author)

AD-A076 336/7 PC **A02**/MF **A01**
Florida State Univ Tallahassee Dept of Statistics
Randomization Tests in Support of Some Statistical Analyses of a Weather Modification Experiment.
Technical rept.,
Ralph A. Bradley , and Elton Scott. Oct 79, 19p
Rept nos. FSU-Statistics-M521, TR-149-ONR
Contract N00014-76-C-0394

The validities of analyses of variance and covariance applied to weather modification experimental data are examined through Monte Carlo samplings of the corresponding randomization distributions. It is found that the parametric tests approximate the randomization distributions well. Thus the use of parametric procedures in exploratory analyses of weather modification data, after appropriate transformation, is justified. The authors comment also on the issue of multiplicity of analyses in data explorations. It is pointed out that analyses that are closely related and explore inherent sources of experimental variation are unlikely to result in misleading conclusions. (Author)

NOAA-TR-NWS-1007-1 PC **A03**/MF **A01**
National Oceanic and Atmospheric Administration, Washington, DC.
Automated Prediction of Boundary Layer Winds and Turbulence for the Savannah River Laboratory. Final Report.
D. B. Gilhousen. 1979, 26p
Contract EY-77-A-09-1007

Objective forecasts of many weather elements produced twice daily for about 230 US cities are made by applying the Model Output Statistics (MOS) technique (Glahn and Lowry, 1972). This technique relates by a statistical method the output of numerical models interpolated to a location (predictors) to a corresponding sample of observed local weather at that location (predictand). This study describes the development and testing of MOS wind forecasts for an instrumented TV tower located near the Savannah River Laboratory (SRL). If shown to be useful, these forecasts could serve as valuable guidance in case of a nuclear incident at the installation. This study introduces several new applications of the MOS technique. In addition to forecasts of wind speed and direction, forecasts of two turbulence parameters were developed and evaluated. These turbulence parameters were the standard deviations of both the azimuth and elevation of the wind. These quantities help to estimate the amount of plume and puff spread. Forecasts of all these elements were produced for several levels on the 335 m WJBF-TV tower. Tests were conducted to see if MOS forecasts of each element were capable of resolving differences between tower levels. MOS forecasts were compared to two other types of forecasts to determine their utility. Short range persistence forecasts served as one type of comparison since SRL uses the current observed winds in their diffusion models. Climatology forecasts served as the other comparison set. (ERA citation 04:052135)

NUREG/CR-0932 PC **A03**/MF **A01**
South Dakota School of Mines and Technology, Rapid City. Inst. of Atmospheric Sciences.
Numerical Simulation of the Effects of Cooling Tower Complexes on Clouds and Severe Storms.
Final rept. Sep 76-Oct 79,
Harold D. Orville, P. A. Eckhoff, J. E. Peak, J. H. Hirsch, and F. J. Kopp. Oct 79, 46p
Contract NRC-04-76-350

A two-dimensional, time-dependent model has been developed which gives realistic simulations of many severe storm processes, such as heavy rains, hail, and strong winds. The model is a set of partial differential equations describing time changes of momentum, energy, and mass (air and water substances such as water vapor, cloud liquid, clcud ice, rainwater, and hail). In addition, appropriate boundary and initial conditions taken from weather sounding data are imposed on a domain approximately 20 km high by 20 km wide with 200 m grid intervals to complete the model. Modifications have been made to the model which allow additional water vapor and heat to be added at several lower grid points, simulating effluents from a power park. The results indicate that a power park emitting 80% latent heat and 20% sensible heat has little effect on the simulated storm. A case with 100% sensible heat emission leads to a much different solution with the simulated storm reduced in severity and the rain and hail redistributed. A case in which water vapor is accumulated in a region and released over a broad depth results in slightly more rain from a severe storm.

PB80-106511 PC **A03**/MF **A01**
General Accounting Office, Washington, DC. Community and Economic Development Div.
Federal Weather Modification Efforts Need Congressional Attention.
1 Nov 79, 43p CED-80-5

Although the Federal Government has supported weather modification programs for more than 30 years, a coordinated Federal approach to these programs has never been established. Numerous studies have cited the need for coordination. In this report, GAO uses rainfall augmentation projects to illustrate problems of weather modification programs. Lack of integrated formal planning and coordination has hindered the progress of these projects. The Congress should define national weather modification research and development policy and direct that a program be developed with goals, objectives, priorities, and milestones. The Congress should designate one agency to administer, maintain, and control the program.

PB80-107154 PC **A03**/MF **A01**
Virginia Highway and Transportation Research Council, Charlottesville.
Analyzing Historical Meteorological Data for Air Quality Analyses.
Final rept. Jul 77-Jun 79,
William A. Carpenter, Ronald L. Heisler, and Samuel F. Curling. Jun 79, 36p VHTRC-79-R54, FHWA/VA-79-R54
Sponsored in part by Virginia Dept. of Highways and Transportation, Richmond.

The Research Council, in cooperation with the Data Processing and Environmental Quality Divisions, developed a set of three computer programs for analyzing historical meteorological data. These programs significantly improve the Department's ability to analyze and employ historical meteorological data. They are computationally efficient and require significantly less computer time than the currently used programs. They also allow the user to compute atmospheric stability categories by either of two recognized algorithms, and admit the processing of temperature data as well as wind data. These programs have been designed to aggregate and then analyze meteorological data on a season and hour-of-day basis.

PB80-113277 PC **A05**/MF **A01**
National Oceanic and Atmospheric Administration, Washington, DC. Environmental Data and Information Service.
Mariners Weather Log.
Elwyn E. Wilson. Sep 79, 81p NOAA-791000101
See also Volume 23, Number 3, PB-298 738.

In addition to its regular sections--Hints to the Observer, Tips to the Radio Officer, Hurricane Alley, On the Editor's Desk, Marine Weather Review and Marine Weather Review and Marine Weather Diary--this issue contains two articles: Manila as a Typhoon Haven, and Western North Pacific Typhoons, 1978.

PB80-802986 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Wind Shear. Volume 2. 1976-November, 1979 (Citations from the NTIS Data Base).
Rept. for 1976-Nov 79,
Guy E. Habercom, Jr. Dec 79, 196p
Supersedes NTIS/PS-78/1315, NTIS/PS-77/1172, NTIS/PS-76/1040, and NTIS/PS-75/874. For the companion Published Search of the Engineering Index Data Base, see PB80-802994. See also Volume 1, 1964-1975, NTIS/PS-78/1314.

The phenomena of wind shear effects in various environments are investigated in these Government-sponsored research reports. Aircraft, spacecraft launchings, atmospheric turbulence, and air/water interactions are among the areas reviewed. (This updated bibliography contains 189 abstracts, 44 of which are new entries to the previous edition.)

PB80-802994 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Wind Shear (Citations from the Engineering Index Data Base).
Rept. for 1970-Nov 79,
Guy E. Habercom, Jr. Dec 79, 168p
Supersedes NTIS/PS-78/1316, NTIS/PS-77/1173, and NTIS/PS-76/1041. For the companion Published Searches of the NTIS Data Base, see NTIS/PS-78/1314, and PB80-802986.

The phenomena of wind shear effects on aircraft, spacecraft launchings, atmospheric turbulence, and air/water interactions are reviewed in these reports gathered in a worldwide literature survey. (This updated bibliography contains 162 abstracts, 21 of which are new entries to the previous edition.)

UHMET-79-09 PC **A04**/MF **A01**
Hawaii Univ., Honolulu. Dept. of Meteorology.
Summer Weather on Haleakala, Maui.
S. W. Lyons. Apr 79, 65p
Contract EG-77-G-03-1617

Meteorological observations from the summit of Haleakala, Maui, high-resolution satellite imagery, and rainfall climatology are examined to determine diurnal and day-to-day variations in weather both at the summit and along the slopes. Results show largest weather variations occur in response to the diurnal mountain heating cycle, while day-to-day weather changes result from continuous and systematic interaction between the local diurnal cycle and synoptic weather patterns. The diurnal cycle produces afternoon maxima and early morning minima in summit temperature, humidity, cloudiness, and rainfall. Summit maximum temperature and cloud amount depend directly on synoptic wind profiles and hydrostatic stability, while minimum temperature is positively correlated (R = .78) with the antecedent maximum temperature. Multiple regression equations are derived for summit humidity, cloud amount, maximum and minimum air temperatures, and wake cloud plume development. (ERA citation 04:049602)

5. BEHAVIORAL AND SOCIAL SCIENCES

5A. Administration and Management

AD-A075 714/6 MF **A01**
Office of the Surgeon General (Army) Washington DC
Three Requirements for the Establishment of Valid Research Requirements,
Charles W. Hill. 1958, 14p
Availability: Microfiche copies only.

In summary, I will simply call again to your attention the three characteristics which I believe to be of greatest importance for the successful functioning of a research requirements system in the military services. First, the responsibility for the conducting of research should be centralized in a separate, autonomous agency which is receptive to, but not constrained by, the problems and requirements of the military operator. Second, the most valuable requirement to be established and maintained within any research system or agency is one calling for a continous, comprehensive and fundamental research effort in specific scientific fields. And third, research administrators at all levels must translate, not just transmit the requirements they receive into more and more researchable hypotheses before passing them on down to the research laboratories for action. (Author)

AD-A075 918/3 PC **A02**/MF **A01**
Naval Postgraduate School Monterey CA
Beyond the Bounds of Rationality.
Conference rept.,
Carson K. Eoyang. Sep 79, 14p Rept no. NPS54-79-010

This conference report describes the activities of a radical workshop on organizational design. Topics discussed were reappraisal of the limits of rationality, identification of alternatives to rationality, connections among extra-rational and non-rational phenomena from diverse disciplines, suggestions for research, and lessons for organizational health and survival.

AD-A075 920/9 MF **A01**
National Defense Univ Washington DC Research Directorate
Procurement of Naval Ships: It is Time for the US Navy to Acknowledge Its Shipbuilders May be Holding a Winning Hand,
Brady M. Cole. Sep 79, 62p Rept no. NATIONAL SEC AFFAIRS MONO-79-5
Availability: Superintendent of Documents, GPO, Washington, DC 20402 HC$2.50.

This study traces the evolution of the Navy's serious problems in parallel with the shipbuilding industry's decline on the world market since World War II. A major portion of the industry's business now comes from government funding. While the number of shipbuilders has decreased, the industry has been dominated by a relatively small number of large corporations for whom shipbuilding is only a minor portion of their corporate business. In turn, the Navy is totally dependent on an industry increasingly inclined to challenge the Navy's procurement and contracting requirements. The report suggests that the Navy adopt a more realistic attitude toward the procurement of its ships, and accept the changes which have occurred in shpbuilding industry. It recommends several specific procedural and contracting changes which might restore a measure of efficiency to the management of the procurement process.

AD-A076 141/1 PC **A08**/MF **A01**
Science Applications Inc McLean VA
Department of Defense In-House RDT and E Activities.
Management analysis rept.,
Harold F. Davidson. 30 Oct 78, 156p
Contract DAAG39-77-C-0069

Each in-house RDT and E activity of the Department of Defense is described on one page in this compilation. The data for 1978 are summarized in tables preceding the main text and charts and tables are provided for each service showing organizational relationships and command chains. All current DOD RDT and E activities which meet the report requirement of having at least 25 per cent of their budget in RDT and E funds are listed in the contents alphabetically within each department. Some T and E facilities which do not meet the requirement previously noted are also listed by special request. Organizational changes during FY 1978 appear in Appendix I. DOD instruction 7700.9 which has been the basis for this report since its inception has been replaced by a tri-service regulation, AR 70-63, NAVCOMPTIST 7044.5D, AFR 80-26, entitled DOD In-House RDTE Annual Activities Report, 1 November 1978. Appendix II contains many of the definitions used in this report and are provided as an additional aid in use of the report. Appendix III lists selected abbreviations and acronyms. Appendix IV lists selected key words with page references.

AD-A076 189/0 PC **A08**/MF **A01**
Army Command and General Staff Coll Fort Leavenworth Ks
An Analysis of the Support Capabilities of the Forward Deployed Corps'.
Final rept.,
Gerald K. Johnson. 8 Jun 79, 151p
Master's thesis.

This study, through use of model corps, attempts to analyze the capability of the forward deployed corps to sustain itself in combat the first 5 days of a 'come as you are' war in Europe. The analysis is performed in the assumed environment of the anticipated OPFOR capabilities and tactics, the United States 'active defense' response, and the logistics requirements generated by that response. It attempts to determine: if the COSCOM, formulated under the 'austere support' principle, is adequate to support the corps until augmentation can be effected; if the combat service support structure detracts from the corps' combat power; and what changes in the COSCOMs employment can be made to improve combat service support. The analysis indicates an organic transportation capability far less than that required which impacts on support available throughout the logistics services spectrum. Further, support plans presently in effect assume host nation support will provide logistics sufficiency. Recommendations of the analysis include quantifications of hostnation support requirements, a reorganization of the COSCOM battalions and further, more detailed analysis in several logistics areas.

AD-A076 195/7 PC **A02**/MF **A01**
Australian Military Forces Canberra Psychological Research Unit (1)
Catalogue of Australian Army Psychology Corps Research Projects. 1978.
Technical note,
T. A. Thurbon. Feb 79, 12p Rept no. TN-1/79

This catalogue of research conducted during 1978 is produced in accordance with the Operating Handbook for the AA Psych Corps 2D-3. It consists of all projects which were undertaken within the Corps and which progressed to a stage where they were identifiable by a title. The catalogue summarises the returns of research submitted by all AA Psych Coprs Units/Appointments. Those projects which have been completed and resulted in the production of a report have been distributed on a scale determined by DPSYCH-A. Some has been limited. Requests for limited Distribution reports should be directed to DPSYCH-A. (Author)

AD-A076 303/7 PC **A07**/MF **A01**
Department of the Army Washington DC
The Army Study Program FY 1979/80.
1979, 127p

The mission of the Army Study System is to provide a formal means, through contract and in-house efforts, for the Army Secretariat, Staff and MACOMs to examine critical problems resulting in planning, programing, and budgeting decisions that affect the Army's overall defense mission. The Army Study Program, FY79/80, which catalogs studies and analyses, provides visibility to programed studies to prevent duplication of study efforts and to ensure that resources are efficiently used.

DOE/TIC-10664 PC **A16**/MF **A01**
Andersen (Arthur) and Co., Washington, DC.
Study of the Treatment of Construction Work in Progress and Tax-Timing Differences for Rate-Making Purposes in the Electric Utility Industry.
25 Mar 77, 360p

A study was prepared encompassing a background analysis of the effects of the inclusion of Construction Work in Progress in the rate base and normalization of all income tax costs of the electric utility industry. These effects are in relation to consumers of electricity, the investor owned electric utilities, bondholders, stockholders, and the public as a whole. Section I is a review of the construction requirements of the industry during recent years and as projected by the industry for the next 10 years and Section II is an analysis of the problems facing the industry in financing these requirements. An analysis of the rate making concept of including CWIP in the rate is given in Section III while an analysis of the rate making concept of full normalization of income taxes is given in Section IV. Section V presents a bibliography of books, articles, speeches and presentations, regulatory commission orders, public testimony, and other sources of

information which were reviewed. The final section contains the report and independent conclusions of Duff and Phelps, Inc., utility financial analysts, who were retained to review these matters from the viewpoint of investors in electric utility securities. They conclude that large construction investments increase the cost of capital but such cost could be avoided to the extend of 30 to 70 basis points if CWIP were included in rate base in constrast to excluding it from the rate base and capitalizing AFUDC. (ERA citation 04:050222)

N80-10852/5 PC **A12**/MF **A01**
ECON, Inc., Princeton, N. J.
The Requirements and Feasibility of Business Planning in the Office of Space and Terrestrial Applications.
J. S. Greenberg, and B. P. Miller. 22 Mar 79, 265p NASA-CR-162388, REPT-79-278-2
Contract NASW-3047

The feasibility of applying strategic business planning techniques which are developed and used in the private sector to the planning of certain projects within the NASA Office of Space and Terrestrial Applications was assessed. The methods of strategic business planning that are currently in use in the private sector are examined. The typical contents of a private sector strategic business plan and the techniques commonly used to develop the contents of the plan are described, along with modifications needed to apply these concepts to public sector projects. The current long-range planning process in the Office of Space and Terrestrial Applications is reviewed and program initiatives that might be candidates for the use of strategic business planning techniques are identified. In order to more fully illustrate the information requirements of a strategic business plan for a NASA program, a sample business plan is prepared for a hypothetical Operational Earth Resources Satellite program.

PB80-106354 PC **A03**/MF **A01**
California Univ., Santa Barbara. Dept. of Political Science.
Community Development in the Colorado River Basin, Future Choices,
Dean E. Mann. Mar 74, 29p NSF/RA/E-74/541
Paper Prepared for AAAS San Francisco Meeting, February 24, 1975-March 1, 1974.

Some options and criteria of measurement available to Colorado River Basin communities for future development are described. The highly varied urban and rural centers of the Southwest are examined on the basis of data much of which was furnished by the communities. Emphasis is on future development with due consideration to the choices between development and growth and conservation and control. Another issue to consider is in what manner the various ethnic, religious, and minority cultures will be treated in this process of choice. Alternative patterns of living in Albuquerque and Tucson are discussed as are those in three rural areas and small towns. Implementation of possible population controls in the Southwest are presented. Cities provide greater individual choice, more varied opportunities, and greater privacy. Smaller communities offer more opportunities for purposeful direction and participation. Communities probably will continue to opt for growth, but the important principle is that individuals and groups have the opportunity to express their choices.

PB80-106727 PC **A05**/MF **A01**
Massachusetts Office of State Planning, Boston.
City and Town Centers, A Program for Growth. The Massachusetts Growth Policy Report.
Sep 77, 97p

The overall purpose of the growth policy process has been to prepare the people of Massachusetts for the difficult choices that must be made if the benefits of continued growth and development are to be enjoyed. The document examines all growth policy statements, Massachusetts' community and regional character, and environmental, and social impacts of sprawl. On the surface, a dilemma emerges from the growth policy process. On the one hand, communities know that the state will and must continue to grow if sufficient employment and housing are to be available for an expanding population. And yet, on the other hand, many communities want to remain the same. This desire to preserve and protect the distinctive character of communities and regions is expressed consistently and compellingly in growth policy statements. Villages don't want to be suburbs; suburbs don't want to be cities; and cities don't want to be wastelands. The goal of revitalizing city and town centers is seen as a direct response to an overwhelming desire to preserve the character of the Commonwealth's communities and regions. Perhaps more importantly it is an appropriate response to the often expressed concerns about the loss of farmland, the deterioration of the environment, exorbitant local and state taxes, the needless waste of limited energy resources, the anticipated demands for decent housing by an unprecedented number of new households, and the nagging problem of chronic unemployment. Because this report has evolved directly from the work of literally thousands of people, its recommendations may enjoy the special status of being understood and supported by a broad cross-section of people in Massachusetts.

PB80-106826 PC **A02**/MF **A01**
New York State Assembly Scientific Staff, Albany.
Applying Science and Technology in the New York State Assembly.
Progress rept. 1 Jul-31 Dec 73,
S. Chapman. 15 Jan 74, 15p NSF/RA/G-74-025
Grant NSF-GT-32162
See also report for Jan-Jun 73,PB-240 833.

In order to introduce technological input into the legislative process to reinforce the sociological, economic, and political inputs to decision making, the Assembly Scientific Staff was established. The primary function of the Staff is to bring scientific and engineering expertise and perspective to the formulation of legislation in the State of New York. A key point is that it is easier to introduce scientific considerations at the outset, before a bill becomes a law, than to try to amend an existing law. The staff functions principally through the chairmen of the Standing Committees of the Assembly in collaboration with the Ways and Means Staff, the Legal Staff, and the Standing Committees Central Staff which is the research and administrative arm of the committees. The Scientific Staff derives information from its own personal expertise, library, and files; from dialogue with experts in universities, professional societies, industries and governmental agencies; and from publications. The key problems are to synthesize technical information of legislative interest from the uncorrelated and diverse backgrounds and positions of experts and their publications, and then to translate this synthesis into everyday language so that members of the Assembly can make more enlightened decisions. A summary of the past six months' activities is included.

PB80-109309 PC **A03**/MF **A01**
Public Technology, Inc., Washington, DC.
Process for Revenue and Expenditure Forecasting in Local Government.
Charles W. Miller, and Hugh L. James. 1977, 29p HUD-0000258, HUD/PDR-283/2
Contracts HUD-H-2357, NSF-iNS75-21491

This information bulletin by the Urban Consortium's Management, Finance, and Personnel Task Force reviews forecasting techniques available to local governments for projecting their revenues and expenditures. It is noted that most jurisdictions do not prepare multiyear projections on any routine basis, even though without the benefit of reliable 3 to 5 year projections, it is difficult to know how best to respond to fiscal crises that for many jurisdictions have a new degree of seriousness. Issues in current methodologies for forecasting are discussed, along with the following approaches commonly used to forecast revenues and expenditures: (1) trend analysis, which assumes that revenues and expenditures will evolve at a rate consistent with rates in the recent past; (2) econometric models; and (3) simulation or simultaneous equation models. Deficiencies of these methods are indicated. One section of the bulletin reports results of a survey of jurisdictions of the Urban Consortium (28 largest cities and 6 selected counties) to identify methods of revenue and expenditure forecasting, level of satisfaction with those methods, results achieved, and desirability for change within those jurisdictions. Most of the large cities and several counties use extrapolation based on recent trends to accomplish their revenue and expenditure forecasting, and although respondents indicate this method has been relatively satisfactory in the past, most agree that problems exist and improvements need to be made. Data from the survey are displayed in tabular form, and a narrative summary of the findings is presented. A project of planned research into the subject of revenue and expenditure forecasting is briefly described. A bibliography is provided.

PB80-109341 PC **A10**/MF **A01**
RAND Corp., Santa Monica, CA.
Hamish Survey Support System: Technical Description. Housing Assistance Supply Experiment.
Working note,
Zahava B. Doering, Susan Welt, and May 78, 211p HUD-0000268
Contract HUD-H-1789

The Housing Assistance Supply Experiment (HASE) is a large - scale social science field experiment designed to test and study the consequences of housing allowances in two sites, St. Joseph County, Ind., and Brown County, Wis. The major source of analytic data for HASE comes from the administration of field surveys and longitudinal data collection from a set of complex, interlocking samples. This document is one of a series of internal notes and working notes describing the record management system that assists both the data collection and analysis efforts. Background information on the survey support system is provided, and the annual survey cycle is briefly described, identifying those junctures at which materials from a survey support system are required. Survey support materials produced for the HASE surveys include information sheets, final status cards, office departmental logs, and directories. The survey support functions and procedures and the software used by the system are also discussed. Section 2 of the document provides user - oriented descriptions of and prototypes for all of the survey support materials developed for the Site I, wave 4 - Site II, wave 3 fieldwork cycle. Each description contains a "population and processing" section that outlines the sample covered by the material and the sort orders produced, followed by an item - by - item discussion of the material. For certain materials, a section detailing its purpose is also provided. The appendix traces the evolution of the information sheets since the baseline surveys.

PB80-109408 PC **A04**/MF **A01**
National Association of Housing and Redevelopment Officials, Washington, DC.
Financial Management Capacity Sharing. Local Government Needs Summary.
Final rept.,
Jul 78, 75p HUD-0000277
Grant HUD-H-2868RG

This is a report of the program methodology, results, and analysis of a local government financial management needs assessment conducted by the National Association of Housing and Redevelopment Officials (NAHRO), contracted by HUD as part of its effort to develop a Financial Management Capacity Sharing Program to aid local governments in the development of improved financial management procedures. The NAHRO program methodology involved the following components: (1) use of a resource team of experts to articulate goals relating to the financial management capacity sharing effort and assist in planning the process of problem identification and implementation to be followed during the course of the project, (2) use of a two - page questionnaire and skilled facilitators as discussion tools, and (3) conduct of five workshops in different geographic regions. The work of the resource team is described, along with workship tools, workshop process, evaluation, and participant selection criteria. Ten problem statements derived from the workshops and resource team efforts are presented. Other significant problems identified but not included in the 10 major problem statements are also described. The appendices include an organization profile of NAHRO, a list of NAHRO resource team members, a HUD program description, a profile of NAHRO participants, problem statements, workshop materials, and results of the National Conference on the Financial Man-

agement Needs of Local Government, June 7 - 9, 1978.

PB80-109424 PC **A04**/MF **A01**
Council of State Community Affairs Agencies, Washington, DC.
State Departments of Community Affairs (DCA's) Financial Management Capacity Sharing: Local Government Needs Summary.
Final rept.,
Jul 78, 74p HUD-0000283
Grant HUD-H-2869G

This report represents a portion of the work contracted by HUD to provide the information necessary to develop a program to help local governments construct more efficient and effective financial management practices. The Council of State Community Affairs Agencies (COSCAA) was contracted to provide input in the needs assessment process concerning financial management problems confronted by local governments. COSCAA is the national organization representing State executive agencies of commmunity affairs. The State Departments of Community Affairs (DCA's) are responsible for a variety of local assistance functions in community development. In its needs assessment strategy, COSCAA sponsored two workshop sessions and prepared case studies to identify the most pressing local financial management needs and promote information exchange among the States. Additionally, the work plan called for COSCAA participation in a 2 - day HUD - sponsored national conference to achieve a consensus with the other public interest group participants on priority local government financial management problems. Ten State DCA's were selected to participate in COSCAA's needs identification case studies. Selection criteria are indicated. The needs found in these case studies are listed and prioritized. Results are also reported from the two workshops and the national conference. In addition, existing DCA resources and suggested programmatic responses are discussed. The appendices contain the following: a description of HUD's Financial Management Capacity Sharing Program, a list of attendees at each of the workshops and representatives to the national conference, workshop agendas, a guideline memorandum for case study preparation, an overview of problems and problem statements, a consolidated list of priority problems, and results memorandums on the workshops and the national conference.

PB80-109440 PC **A04**/MF **A01**
Public Technology, Inc., Washington, DC.
Urban Consortium Financial Management Capacity Sharing Local Government Needs Summary.
Final rept.,
Jun 78, 75p HUD-0000292
Grant HUD-H-2859RG

The process and product of the Urban Consortium's 2 - day workshop in Denver, Colo., on April 13 - 14, 1978, is described. The aim of the workshop was to improve the capacity of local government financial management to contribute to resolving problems, increasing effective administration, and making sound program and policy decisions. The 20 workshop participants, selected from nominations with an emphasis on senior management functions, were asked to identify and set priorities on their perceptions of the financial management needs in their jurisdictions. The following were selected as the most significant financial management problems existing in Urban Consortium jurisdictions: (1) identify, measure, and improve the effectiveness and efficiency of local government services; (2) improve intergovernmental fiscal relations; (3) develop skills; (4) integrate planning, budgeting, and financial reporting functions; and (5) improve long - range financial projections, analysis, and planning. Specific needs within these broad areas are also indicated. Innovative programs in financial management are briefly described for each jurisdiction represented. The appendices include a list of workshop participants, initial problem statements, themes for initial problem statements, consolidation of problem statements and themes by workgroups, theme consolidation, issue outline, priority problem statements, selected bibliography, financial management capacity sharing program, and results of the national conference on the financial management needs of local government.

PB80-109507 MF **A01**
Advisory Commission on Intergovernmental Relations, Washington, DC.
Challenge of Local Governmental Reorganization. Volume III: Substate Regionalism and the Federal System.
Feb 74, 201p HUD-0000329
Paper copy available from the Sup. of Docs., Stock number 052-004-00056

Traditional methods of regional cooperation and of local and areawide governmental reorganization are examined. The desirability and practicality of traditional methods for regional cooperation and governmental reorganization are assessed, and the relationship between districting and reorganization is analyzed. Recommendations are made on local governmental reorganization to guide Federal, State, and local policymakers in establishing a more effective regional governance process. The following specific topics are addressed in the study: assignment of substate functions (local and areawide); intergovernmental service agreements and transfer of functions; the metropolitan county; annexation, consolidation, and federation; nonmetropolitan governmental patterns; and local government reorganizational issues. It is concluded that all substate regions require an authoritative areawide decisionmaker and that all but a few of such areas require strengthening of their local units. Supporting tabular data are appended.

PB80-109572 MF **A01**
Council of State Governments, Lexington, KY.
State Planning: Intergovernmental Policy Coordination.
Executive summary,
Aug 76, 26p HUD-0000362, HUD/PDR-205
Contract HUD-H-2222R
Paper copy available from the Sup. of Docs., Stock number 023-000-00380-5

The State planning intergovernmental policy project involved a major study to articulate the current status and direction of State planning. Researchers gathered information through contacts with numerous State government personnel, an advisory committee broadly representative of the State planning community, senior staff with substantial planning experience, and through interviews with more than 200 officials in 29 States. States are faced with the problem of operating on smaller budgets and, therefore, need to improve their management capability, conduct programs more effectively, and assure that government activities are directed to the accomplishment of priority objectives. To achieve this end, governors need a mechanism for coordinating plans, policies, and those programs that proliferate within their governments and are imposed by the Federal Government. Survey data reveal that most States lack overall State policy guidelines against which officials can evaluate State and Federal activities. States need plans which provide direction for current and future activities. But producing the truly comprehensive plan has proved an impractical objective for most States. It is suggested that State policy be spelled out in terms of formal plans, published guidelines, policy statements, executive orders, and legislation establishing policy direction. A basis for functional planning, budget preparation, and planning coordination should be identified and articulated. Important components of an overall State policy framework might be land use and economic planning and capital improvements programing. The State budget, particularly if prepared in a program format, is a good short - term comprehensive plan. State - local partnerships can be achieved by State encouragement and support of multipurpose regional councils through adequate funding and by providing opportunity for council participation in State decisionmaking. Tabular data are provided.

PB80-109614 PC **A03**/MF **A01**
Municipal Finance Officers Association of United States and Canada, Chicago, IL. Government Finance Research Center.
Financial Management Capacity Sharing Program.
Final rept.,
30 Dec 78, 49p HUD-0000370

The Municipal Finance Officers Association (MFOA) conducted research to improve the overall quality of local government financial management needs and solve problems encountered by the municipal finance community. MFOA conducted 14 workshops providing the representatives of local government with opportunities to identify and establish priorities among problems in financial management and to specify requirements for workable solutions. In addition, the workshops allowed finance officers to present and exchange details on effective innovative practices of local government. The over 500 participants at the workshops were asked to complete a survey dealing with management problems in budgeting, accounting, auditing, debt management, treasury management, and pensions, and to specify problems and solutions in Federal - State - local relations. A standing committee at the MFOA annual conference was presented with the problem statements based on problems and priorities identified during the workshops, asked to review and comment on the problem statements, and requested to review workshop reports to determine potential training and technical assistance responses. MFOA also held meetings on this subject with persons responsible for graduate programs in public administration and with municipal bond credit analysts. MFOA consolidated the overlapping problems and submitted a list of 14 problems to HUD for an indepth discussion. These priority problems are presented in this report in formats containing subject, problem statement, symptoms, causes, suggested solutions, key actors, constraints and requirements, alternatives, and resources. The following are examples of priority problems: (1) insurance is difficult for municipalities to obtain and high premiums accompany those policies available; (2) local officials are unable to specify the type of computer or program needed to meet financial management and reporting needs; and (3) local government finance officers are unable to evaluate investment performance.

PB80-109721 PC **A08**/MF **A01**
National League of Cities, Washington, DC.
Financial Management Capacity-Sharing Program: An Assessment of Municipal Needs.
Final rept.,
Aug 78, 162p HUD-0000382
Grant HUD-H-2861G

The financial management capacity - sharing program is a programmatic response to the increasing problems facing local governments in their financial management practices. The National League of Cities assessed specific problems and needs of elected officials in local government by conducting four workshops and a national survey of financial management problems and needs and prepared a summary to describe the results. Three of the workshops discussed accounting and auditing, budgeting, cash and investment management, debt management, Federal - local government relations, local fiscal and economic policy, pension management, State - local government relations, and the local elected official's role in budgeting, and the fourth workshop reviewed and modified the priorities derived from the other three. A questionnaire was sent to the mayors of 1,200 cities, and the 300 responses represent the problems of greatest concern to these officials. The National Conference on Financial Management Needs in Local Government held in June 1978 set out 44 problem statements from which 21 were selected as priorities. Discussion groups focused on clarifying the problems and causes and suggesting solutions. Discussion is included of the processes and priorities which emerged from these activities, along with a review of the high degree of correspondence found between the needs identified in the workshops and in the survey and between both these sets with those priorities highlighted at the conference. Data generated from the workshop discussions are presented by topic in outline form in terms of symptoms, causes, key actors, and constraints. Thirteen appendices contain information discussed in the report and list recent publications on local government financial management.

PB80-109812 PC **A02**/MF **A01**
Wilmington Dept. of Planning and Development, DE. Planning Div.
Exchange of Information About Productivity.
Elliott Golinkoff. Jan 79, 12p HUD-0000396

An overview is provided of the results of a HUD - funded program in Wilmington, Del., aimed at sys-

tematizing the intercity exchange of information on local government management and administration. It was concluded that a Federal agency or the International City Management Association, rather than an individual city, was the appropriate vehicle for such a productivity information clearinghouse. Also, resource - poor or stressed cities (such as many of those covered in the initial sampling) find it difficult to make the investment necessary for such information exchange. As a result, they have the greatest need for information on productivity - increasing activities that they can copy and are the least likely to develop measures of interest to other cities. Lists of the cities involved are appended, along with a narrative description of the scope of the questionnaire.

PB80-109846 PC **A02**/MF **A01**
Wilmington Dept. of Planning and Development, DE. Planning Div.
Zero Base Budgeting and Productivity Improvement in Wilmington.
Elliott Golinkoff. Jan 79, 15p HUD-0000400

Wilmington, Del., attempted to combine the use of formal productive programs and zero base budgeting procedures for the fiscal year beginning July 1976. Productivity programs involve a central staff which works full time on development of productivity improvement techniques to be implemented in various departments. Zero base budgeting procedures develop descriptions of consequences of operating programs at various dollar or service levels. The major weakness discovered in the first year of implementation was inadequate program measures. Measures for fiscal year 1978 were to be oriented less toward workload and more toward specific department objectives. Objectives were to be end oriented, specified and expressed in quantifiable terms, realistic and obtainable but challenging, and related to the fundamental program purpose. Staff members, working on a department - by - department basis, were able to develop performance measures and goals that were taken seriously by department heads, and the Wilmington experience shows that zero base budgeting is compatible with strong emphasis on measurement of performance against objectives. The system yielded the following results: (1) all decisionmaking officials have information on all operating programs, (2) the system has a method for adjusting to budget reductions based on examination of tradeoffs among various programs, (3) the process resulted in more management involvement in considering the budget, (4) the system provides a basis for tying budget and management together, (5) preparing program packages resulted in awareness of interactions and comparisons of the importance of spending among programs, and (6) departments learned that there are various ways to accomplish objectives. An appendix contains a sample of a monthly department report.

PB80-115124 PC **A08**/MF **A01**
Municipal Finance Officers Association of United States and Canada, Washington, DC.
An Accounting Handbook for Small Cities and Other Governmental Units (Small Cities Financial Management Project),
Philip Rosenberg, and C. Wayne Stallings.
c1978, 153p ISBN-0-89125-023-9, NSF/RA-780624
Grant NSF-APR76-19208
See also PB80-115132. Prepared in cooperation with Peat, Marwick, Mitchell and Co., and Georgia Univ., Athens. Inst. of Government. Library of Congress catalog card no. 78-71711.

Detailed descriptions of the following practices constitute the bulk of the text: (1) Accounting records should be maintained consistent with accepted accounting principles; (2) Accounting procedures should be designed to provide for routine internal checks on all financial transactions; (3) Monthly reports should identify both expenditures and purchase commitments; (4) Detailed accounting is performed on all elements in the budget structure; (5) Accounting reports should differentiate among the different types of funds; (6) Regular monthly and annual financial reports should present a summary of financial activity by major types of funds; (7) Financial reports separately identify the income and expenses associated with each government operated utility; (8) Cost analysis for utilities includes allowances for capital costs along with normal operating costs; (9) Accounting activities should be centralized under a single administrative official; (10) A periodic audit should be performed by an independent or certified public accountant; and (11) Automated data processing should be used where transaction volumes warrant.

PB80-115132 PC **A07**/MF **A01**
Municipal Finance Officers Association of United States and Canada, Washington, DC.
An Operating Budget Handbook for Small Cities and Other Governmental Units (Small Cities Financial Management Project),
Philip Rosenberg, and C. Wayne Stallings.
c1978, 145p ISBN-0-89125-029-8, NSF/RA-780623
Grant NSF-APR76-19208
See also PB80-115140. Prepared in cooperation with Peat, Marwick, Mitchell and Co., and Georgia Univ., Athens. Inst. of Government. Library of Congress catalog card no. 78-71727.

The handbook presents a set of techniques a municipality may use to develop an annual operating budget. The text is based on a set of 21 desirable budget practices and contains detailed sections on the following primary budget functions: (1) organizing the budget function; (2) preparing the annual budget; (3) using the budget to plan for municipal services; (4) adopting the budget; (5) implementing the budget; and (6) long-range budget planning. In addition, detailed appendices are provided to support many of these discussions.

PB80-115140 PC **A06**/MF **A01**
Municipal Finance Officers Association of United States and Canada, Washington, DC.
A Treasury Management Handbook for Small Cities and Other Governmental Units (Small Cities Financial Management Project),
Philip Rosenberg, C. Wayne Stallings, and Charles K. Coe. c1978, 103p ISBN-0-89125-026-3, NSF/RA-780622
Grant NSF-APR76-19208
See also PB80-115157. Prepared in cooperation with Peat, Marwick, Mitchell and Co., and Georgia Univ., Athens. Inst. of Government. Library of Congress catalog card no. 78-71725.

An overview is presented of the treasury management activity in a local government so that top level government officials and nonfinancial managers can understand and evaluate treasury management in their own jurisdictions and initiate appropriate action to improve it. Forming the bulk of the text are detailed discussions of essential steps to be followed for achievement of maximum cash availability and yield while ensuring safety of principle: (1) Establish sound financial control and cash information systems; (2) Detail legal, policy, and procedural requirements; (3) Obtain bank services at the lowest cost; (4) Understand the full range of investment securities; (5) Establish effective cash collection, deposit, and disbursement procedures to maximize cash availability; (6) Use sound investment procedures; and (7) Establish and evaluate treasury management goals.

PB80-115157 PC **A04**/MF **A01**
Municipal Finance Officers Association of United States and Canada, Washington, DC.
A Debt Management Handbook for Small Cities and Other Governmental Units (Small Cities Financial Management Project),
Philip Rosenberg, and C. Wayne Stallings.
c1978, 68p ISBN-0-89125-027-1, NSF/RA-780621
Grant NSF-APR76-19208
See also PB80-115156. Prepared in cooperation with Peat, Marwick, Mitchell and Co., and Georgia Univ., Athens. Inst. of Government. Library of Congress catalog card no. 78-71726.

The handbook describes practices and procedures for issuing and administering debt in small cities and other governmental units. Sound debt management encompasses specific broad steps: (1) Decide whether to incur debt and how it will be structured; (2) Secure needed specialized services; (3) Obtain public support for general obligation issues; (4) Design the bond issue's features; (5) Draft the bond security agreement; (6) Market the bonds; and (7) Administer the outstanding debt. The text comprises identification and detailed discussion of each step. A disclosure guidelines outline and glossary are provided in the appendix.

PB80-115165 PC **A05**/MF **A01**
Municipal Finance Officers Association of United States and Canada, Washington, DC.
A Capital Improvement Programming Handbook for Small Cities and Other Governmental Units (Small Cities Financial Management Project),
Philip Rosenberg, and C. Wayne Stallings.
c1978, 80p ISBN-0-89125-025-5, NSF/RA-780620
Grant NSF-APR76-19208
Prepared in cooperation with Peat, Marwick, Mitchell and Co., and Georgia Univ., Athens. Inst. of Government. Library of Congress catalog card no. 78-71712. See also PB80-115124.

Capital expenditures include expenditures for buildings, land, major equipment, and other commodities which are of significant value and have a useful life of several years. The capital improvement program (CIP) lists each proposed capital item to be undertaken, the year in which it will be started, the amount expected to be expended in each year, and the proposed method of financing these expenditures. Based on these details, summaries of capital activity in each year can be prepared as well as summaries of financial requirements, such as amounts of general obligations, bonds to be issued, amounts of general operating funds required, etc. Principle steps to be followed for implementation and maintenance of the capital improvement program and budget are presented along with detailed discussions and procedures.

5B. Documentation and Information Technology

AD-A075 720/3 PC **A06**/MF **A01**
Army Military History Research Collection Carlisle Barracks Pa
A Suggested Guide to the Curricular Archives of the U.S. Army War College 1907-1940.
Special bibliographic series no. 8,
Benjamin Franklin Cooling. May 73, 104p

The assigned mission of the United States Army War College since its inception in 1901 has been to prepare selected officers for high command and staff duty. The honor roll of its graduates reflects accomplishment of this mission. But as the names and tasks of those graduates have changed through the years, so have the curricular offerings which spawned their professional abilities. Thus, it becomes fundamentally important for understanding twentieth century military events, institutions, and personalities that we comprehend the multifaceted educational approach which produced the Pershings, the Eisenhowers, and the Ridgways--nay, even the countless thousands who remained unknown beyond the cloister of Mars. Such necessity leads to the historical value of the curricular archives of the Army War College.

AD-A075 805/2 PC **A02**/MF **A01**
Klein Associates Yellow Springs Oh
User Guides: Some Theoretical Guidelines for Their Use.
Research rept.,
Gary A. Klein. Oct 79, 25p Rept no. TR-SCR-79-8
Contract F49620-79-C-0179

Recognitional capacity is needed in order to perform tasks: a recognition of when procedures apply. Further, recognitional capacity cannot be replaced by higher-level procedures. This creates an insurmountable barrier for guidebooks that attempt to provide step-by-step procedural accounts of task performance. User guides will be most successful when they attempt to show novices how to perform procedural tasks. However, step-by-step user guides will be least successful when applied to tasks involving recognitional capacity, with the goal of developing high levels of proficiency. The information gathered will be voluminous and difficult to present, but will also be criticized as insufficient. It is suggested that the way to overcome the barrier presented by recognitional capacity is by approaching it directly, perhaps as a type of analogical inference, rather than by trying to decompose it into more procedures. (Author)

AD-A075 977/9 PC **A08**/MF **A01**
Computer Corp of America Cambridge Ma
A Distributed Database Management System for Command and Control Applications.
Semi-annual technical rept. no. 5, 1 Jan-30 Jun 79.
30 Jul 79, 168p Rept no. CCA-79-23
Contract N00039-77-C-0074

This report summarizes the fifth six month period of a project entitled: 'A Distributed Database Management System for Command and Control Applications'. The primary focus of this effort is to design and implement a distributed database management system called SDD-1 (System for Distributed Databases). SDD-1 being installed in phases into the Advanced Command and Control Architectural Testbed (ACCAT) at the Naval Ocean Systems Center (NOSC). SDD-1 is a database management system (abbr. DBMS) with capabilities similar to those found in many currently available centralized DBMSs. However, unlike any currently available DBMS, SDD-1 is implemented on multiple processors geographically distributed and interconnected in a computer network.

AD-A076 066/6 PC **A03**/MF **A01**
Defence and Civil Inst of Environmental Medicine Downsview (Ontario)
A Doppler Ultrasonic Data Bank for Diver Decompression Analysis,
K. E. Kisman , G. Masurel , and R. Guillerm. Aug 79, 41p Rept no. DCIEM-79-R-28

A data bank for Doppler ultrasonic bubble flow data obtained during and following decompression of divers has been established for the purpose of data storage and subsequent computer analysis. Each dive is characterized by 52 parameters selected for future computer correlation studies. For each of 12 of the parameters, a table has been provided into which entries may be made as the data bank grows. Data are entered into the data bank via a specified Data Bank Form. A program entitled DEV is used for listing and verification of data bank files; another entitled SEV is used to calculate an index of severity of decompression. A listing and example are provided for each of the programs, SEV and DEV. The program, SEV, is the first of many possible applications programs utilizing the data bank. The use of the data bank and the application of SEV in an experimental program involving 80 man-dives is described. (Author)

AD-A076 142/9 PC **A09**/MF **A01**
Army Field Artillery School Fort Sill Ok
The 'U' Military Science Library Classification Schedule of the Morris Swett Library, USAFAS.
Final rept.,
Morris Swett. 1979, 193p Rept no. INDEX-4

In 1929, MSG Morris Swett (in who's memory the USAFAS library has been named since 1968) devised this library classification schedule. His intention was to develop a plan that was broader than the Dewey Decimal and more complete than the Library of Congress classifications. Five subsequent library catalogers have developed the product to what it has become today. Although the subject of artillery is emphasized, it may have application for other military libraries. As such it is designed to support the Third Edition of the Library of Congress 'U' schedule; not to supplant it. (Author)

AD-A076 207/0 PC **A07**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB Oh School of Engineering
An Investigation Into the Market Structure of the Foreign Technology Division.
Master's thesis,
Jesse F. Jenkins, Jr. Sep 79, 132p Rept no. AFIT-GSM/SM/79S-7

This study analyzes the opinions and requirements of users of FTD produced Scientific and Technological (S&T) intelligence. Data was collected from a self-response survey. Respondents identified the importance of current and future functional areas of S&T intelligence, kinds of S&T intelligence, reporting formats and dissemination methods. Discriminant analysis was used to identify the profiles and special needs of clients. Products were evaluated for curency and content. Results of this investigation indicate the R&D user as the single most influential user of FTD products. The weapon systems handbook is the most important reporting format for a majority of users. The need time frame of S&T intelligence is less than two years for 71.3% of the sample. There is an overall lack of knowledge concerning the Intelligence Production Requirements System. Currency of S&T intelligence products is a problem because no collective register, known to users, identifies document currency. Continued investigation was recommended to further indentify the needs and requirements of users of FTD produced S&T intelligence.

AD-A076 250/0 PC **A02**/MF **A01**
Army Field Artillery School Fort Sill Ok
The Professional Development of the Field Artilleryman - 1980. A Selected Bibliography.
Final rept.,
Lester L. Miller, Jr. 1979, 10p Rept no. SB-67
Special bibliography.

This bibliography presents book titles and periodicals designed to support the reading interests of military personnel. Emphasis is on titles recently in print, culled from the holdings of the Morris Swett USAFAS Library. (Author)

DOE/TIC-4585-R1(Sup.2) PC **A03**/MF **A01**
Department of Energy, Oak Ridge, TN. Technical Information Center.
Energy Information Data Base. Corporate Author Entries, June 1978--June 1979.
Jun 79, 43p

This supplement contains additions to TID-4585-R1 (the authority list for corporate author names used by TIC), and is intended for use with that publication. Supplements are cumulative from June 1978 until another revision is issued. (ERA citation 04:054007)

N80-10538/0 PC **A99**/MF **A01**
National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
Apollo-Soyuz Test Project. Volume 2: Earth Observations and Photography.
F. El-baz, and D. M. Warner. 1979, 700p NASA-SP-412-V-2
Contract NAS9-13831
Seri-2. Misc-Original Contains Color Illustrations.

No abstract available.

N80-10967/1 PC **A06**/MF **A01**
National Aeronautics and Space Administration, Washington, D. C.
Nasa Tech Briefs Index, 1978.
1978, 123p NASA-SP-5021(20)

Approximately 601 announcements of new technology derived from the research and development activities of the National Aeronautics and Space Administration are presented. Emphasis is placed on information considered likely to be transferrable across industrial, regional, or disciplinary lines. Subject matter covered includes: electronic components and circuits; electron systems; physical sciences; materials; life sciences; mechanics; machinery; fabrication technology; and mathematics and information sciences.

N80-10968/9 PC **A06**/MF **A01**
National Aeronautics and Space Administration, Washington, D. C.
Nasa Tech Briefs Index, 1977, Volume 2, Numbers 1-4.
1977, 99p NASA-SP-5021(19)

Announcements of new technology derived from the research and development activities of NASA are presented. Abstracts, and indexes for subject, personal author, originating center, and Tech Brief number are presented for 1977.

PB80-105190 PC **A05**/MF **A01**
MITRE Corp., McLean, VA. METREK Div.
Development and Uses of the Chemical Information Resources Directory.
Final rept.,
K. Levitan, T. Bishop, T. Kuch, R. Rader, and S. Sood. Aug 79, 79p MTR-79W00128-VOL-1
Contract EQ7AC010
See also Volume 2, PB80-105208.

Volume I presents the concept of a Chemical Information Resources Directory and discusses its development, uses, design, and structure. The process of selecting data bases and other information resources for inclusion in the Directory is presented, followed by a detailed discussion of the two principal parts of the Directory, the Descriptive Catalog and the Subject Catalog. Recommendations for maintenance, enhancement, and further development are included.

PB80-105208 PC **A99**/MF **A01**
MITRE Corp., McLean, VA. METREK Div.
Chemical Information Resources Directory: Descriptive and Subject Catalogs.
Final rept.,
K. Levitan, T. Bishop, T. Kuch, R. Rader, and S. Sood. Aug 79, 673p MTR-79W00128-VOL-2
Contract EQ7AC010
See also Volume 1, PB80-105190.

The Directory is composed of two parts: a Descriptive Catalog containing descriptions of content attributes, access attributes, and organizational support of 53 chemical information resources which include data centers and data bases; and a Subject Catalog, which provides a classification scheme, system vocabulary and an index to subject descriptors of each resource.

PB80-106545 PC **A03**/MF **A01**
General Accounting Office, Washington, DC. Logistics and Communications Div.
Improvements Are Needed in the Management of the National Archives Preservation and Trust Fund Activities.
26 Oct 79, 28p LCD-80-13

The National Archives and Records Service has made little headway in preserving its 3 billion textual records because of the high costs of repair. Microfilming these records may be a viable alternative. Funds for preserving archival records have not been used effectively and must be deobligated. In addition, Archives facilities do not meet its environmental standards for storing historical records. Legislation governing the National Archives Trust Fund is broad, and Archives has applied the broadest interpretations. As a result, business-type activities are included in the trust fund. The cost accounting system for the trust fund is not adequate for the types of activities performed. Further, Archives has improperly used the Trust Fund Board's direct-hire authority and interchanged employees between trust fund and appropriated activities without the required approval of the Office of Personnel Management.

PB80-108319 PC **A07**/MF **A01**
Computer Corp. of America, Cambridge, MA.
A Prototype Chemical Substances Information Network.
Final rept.
21 Aug 79, 146p CCA-79-19
Contract EQ8AC028

A concept for a prototype Chemical Substances Information Network (CSIN) is presented in this report, which covers usage, alternative system architectures, recommended capabilities, and system design. The proposed prototype will deliver significant utility to the prospective CSIN user community.

PB80-114531 PC **E04**/MF **A01**
National Library of Medicine, Bethesda, MD. MEDLARS Management Section.
NLM Online Services Reference Manual.
Jan 80, 582p NLM/MED-79/06
Supersedes PB-291 793.

The report is a comprehensive manual for the operation of the various NLM online data bases. It contains specific information on modes of accessing these data bases, the commands which may be used, techniques for searching them, etc. It includes instructions on the use of MEDLINE, AVLINE, CATLINE, NAME AUTHORITY FILE, SERLINE, TOXLINE, CHEMLINE, RTECS, TOXICOLOGY DATA BANK, CANCERLIT, CANCERPROJ, CLINPROT, EPILEPSY, MEDLEARN, BIOETHICS, HISTLINE, and HEALTH PLANNING AND ADMINISTRATION.

PB80-801509 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.

Technology Transfer: General and Theoretical Studies. Volume 2. 1977-December, 1979 (A Bibliography with Abstracts).
Rept. for 1977-Dec 79,
Mary E. Young. Dec 79, 186p
Supersedes NTIS/PS-78/1274, NTIS/PS-77/1131, NTIS/PS-76/1008, NTIS/PS-75/884, and COM-74-11194. See also Volume 1, 1972-1976, NTIS/PS-78/1273.

The cited reports cover research in technology transfer from 1977 to December, 1978. Included are topics on Government policies, aid to developing countries, feasibility studies, proposed methodologies, and theory. Specific applications and single-topic technological utilization reports have been eliminated. (This updated bibliography contains 178 abstracts, 55 of which are new entries to the previous edition.)

5C. Economics

AD-A075 801/1 PC **A05**/MF **A01**
Construction Engineering Research Lab (Army) Champaign IL
Ireland/United Kingdom-Research Consortium. Report Number 1. The Construction Industry-A Perspective,
Thomas F. Boland. 9 Feb 79, 78p

This report identifies the construction industry as an entity in the sociocultural realm and develops a perspective of it by: describing it in general; developing of it a notational physical structure and form; identifying the purpose for which it and its component entities exist; describing parameters that may be used to assess the degree to which it and its entities fulfill their purpose; identifying it and its component resource requirements and the outputs expected of them; and examining its ability to monitor and adapt in response to internal and external influences. (Author)

AD-A075 925/8 PC **A06**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH
Selected Bibliography of Socioeconomic Analysis of Regulated and Health Industries.
Interim rept.,
Kenneth L. Hamilton. Jun 79, 113p

This document is a selective bibliography of literature in socioeconomic analysis of regulated and health industries. The material was compiled over a period of two years and represents extensive literature search. The first part of the document is alphabetical by author in a general listing. The middle part is categorized by each part of the bibliographic citation, i.e., facts of publication for journals lists all the citations by journal title, volume, date, and pages. This area is of particular utility in the library in reviewing the actual documents. The last part of the document is the classified by topic listing. In this section, the cross-classification codes are listed for ease of reference to other areas and titles. (Author)

AD-A075 941/5 PC **A03**/MF **A01**
Center for Naval Analyses Alexandria VA Inst of Naval Studies
The Estimation and Interpretation of Several Selectivity Models.
Professional paper,
Robert P. Trost. Jun 79, 42p Rept no. CNA-PP-251
Grant NSF-SOC76-04356

In recent years there have been a large number of studies that deal with the problem of selectivity bias in the data. Here the term 'selectivity bias' refers to non-randomly distributed observed data. This non-randomness can occur whenever the data we have are generated by the choices that individuals make. A review of selectivity problems in econometric models can be found in two papers by Maddala (1977). The purpose of the present paper is to review several models not discussed in Maddala's (1977) papers, and to give a further interpretation of the covariance terms that are particular to selectivity models. This should enhance the understanding of these models.

AD-A075 960/5 PC **A03**/MF **A01**
Public Research Inst Alexandria VA
The Price Differential between Domestic and Imported Steel,
James M. Jondrow , David E. Chase , and Christopher L. Gamble. Oct 77, 41p Rept no. CRC-311
Contract DL-J9-K6006-05

In most years since the late 1950's, the price of imported steel has been below the domestic price. This low import price has been a recurrent worry to steel workers and producers, who fear that imports will force domestic mills out of business. Little help is expected from buyer loyalty to American steel: steel is steel and the buyer need only find the cheapest source. The concerns of the steel producers and workers seem, at first, well founded in economic theory: two products which substitute perfectly in use simply cannot sell at different prices; either the higher price will fall to meet the competition or production of the higher priced one will stop. But the production of domestic steel has not stopped, even though domestic producers have lost some ground to imports. Since the late 1950's, when imports first became low priced, the demand for imports has grown steadily and, sometimes, suddenly, as in 1968. Still, the amazing story is not that imports have grown swiftly, but that they have grown slowly. In 1962, imports had 6 percent of the U.S. market. In 1976, 14 years later, they had 14 percent. So each year, on the average, imports have increased their share of the market by less than one percent. (Author)

AD-A076 028/0 PC **A03**/MF **A01**
Imperial Coll of Science and Technology London (England) Dept of Computing and Control
Complexity and Complexity Change in a Large Applications Program.
Final technical rept. 29 Sep 77-28 Dec 78,
G. Benyon-Tinker , and M. M. Lehman. Apr 79, 48p Rept no. R/D-2464
Contract DA-ERO-78-G-017

This report describes an investigation into the complexity of a single large banking application program, and into the changes in complexity which have occurred as result of the maintenance process. The program, which is written in Algol, was developed to run as middleware on Burroughs computers. It has been in use for the last 5 years, during which time it has grown from a size of 36K source lines to 64K source lines by series of 13 releases, planned to occur at regular intervals. (Author)

AD-A076 134/6 PC **A04**/MF **A01**
Public Research Inst Alexandria VA
Arizona Employment and Unemployment Data Code Book,
Louis Jacobson , and Kathleen Classen. Feb 78, 69p Rept no. CRC-351

The Arizona Employment and Unemployment Data Set (AZEUD) is made up of information drawn from administrative records of government agencies in two separate samples: A 20% sample of workers who applied for unemployment insurance (UI) in Arizona 1963-71; and A 1% sample of the Arizona labor force 1957-72. The 20% sample is drawn from the Continuous Wage and Benefit History (CWBH) data, a data set maintained by the Arizona Bureau of Employment Security (AZBES). This data set contains detailed longitudinal histories of both the employment and unemployment experience of workers who claimed UI benefits in Arizona, 1963-71. In total, about 40,000 workers are in the 20% sample. The 1% sample is derived from the Social Security Administration's Longitudinal Employee-Employer Data (LEED) file. The data file contains detailed longitudinal histories of the employment experience of workers covered by Social Security employed in Arizona 1957-72. There is no explicit indicator of whether or not workers in this file claimed unemployment insurance. In total, about 25,000 workers are in the 1% sample.

AD-A076 280/7 PC **A14**/MF **A01**
General Electric Co Washington DC Tempo
The Analysis of Methodologies and Techniques for Estimating Soviet Resource Allocation. Volume I. Highlights and Current Results.
Summary rept.,
Gordon C. McMeekin , and Rex D. Minckler. 1 Jun 79, 305p Rept no. GE78TMP-43
Contract N00014-77-C-0676

The overall objectives of this research are to characterize and analyze current methodologies and techniques for estimating Soviet resource allocation and to identify and define possible new methodologies and techniques. The scope of this summary includes: Identification, categorization, and analysis of current techniques for estimating Soviet National Security Expenditures (NSE) and their associated numerical estimates; Development of an econometric evaluation methodology for formulating and testing statistical hypotheses based upon the estimation of possible information and methodology errors; Definition and performance of selected resource allocation experiments for the purpose of evaluating the level, composition, and rate of growth of estimated Soviet NSE; A discussion of the implications of alternative estimates of Soviet NSE from the standpoint of overall ex post Soviet resource allocation; An evaluation of the sectoral economic burden of Soviet NSE from the standpoint of ex post Soviet resource allocation; A review of the Bergendorff-Strangert Model for purposes of illustrating ex ante trade offs in resource allocation and the introduction of an energy constraint.

CONS-2858-T1 PC **A04**/MF **A01**
Systems Control, Inc., Palo Alto, CA.
Descriptor-Variable Approach to Modeling and Optimization of Large-Scale Systems. Final Report, March 1976–February 1979.
D. N. Stengel, D. G. Luenberger, R. E. Larson, and T. B. Cline. Feb 79, 71p
Contract ET-78-C-01-2858

A new approach to modeling and analysis of systems is presented that exploits the underlying structure of the system. The development of the approach focuses on a new modeling form, called 'descriptor variable' systems, that was first introduced in this research. Key concepts concerning the classification and solution of descriptor-variable systems are identified, and theories are presented for the linear case, the time-invariant linear case, and the nonlinear case. Several standard systems notions are demonstrated to have interesting interpretations when analyzed via descriptor-variable theory. The approach developed also focuses on the optimization of large-scale systems. Descriptor variable models are convenient representations of subsystems in an interconnected network, and optimization of these models via dynamic programming is described. A general procedure for the optimization of large-scale systems, called spatial dynamic programming, is presented where the optimization is spatially decomposed in the way standard dynamic programming temporally decomposes the optimization of dynamical systems. Applications of this approach to large-scale economic markets and power systems are discussed. (ERA citation 04:051770)

DOE/EIA-0022/1 PC **A02**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
National Electric Rate Book: Kentucky.
Oct 77, 17p

Rate schedules for electric service in communities of 2,500 or more for residential, commercial, and industrial services are presented for Kentucky. In addition to communities of 2,500 or more, all towns and villages with populations between 1,000 and 2,500 served under residential rate schedules available in the larger communities are listed. Rare schedules include customers for lighting, heating, power, and other purposes. Omitted are those applicable exclusively to resale service, railways, government bodies, agricultural, and rural service. (ERA citation 04:053329)

DOE/EIA-0040/1 PC **A10**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Typical Electric Bills, January 1, 1978.
Aug 78, 217p

The survey provides comprehensive coverage of the cost to consumers for representative amounts of electricity used per month for residential, commercial, and industrial service in all sections of the Nation. Bills for residential electrical service are reported for five different energy consumption levels

in all communities with populations of 2,500 or more. For commercial and industrial service, bills are presented for all large cities. Commercial bills are shown for five combinations of billing demands in kW and monthly consumption levels in kWh; industrial bills cover five billing demands and ten consumption levels. Long-term trends and current levels of average electric bills for residential, commercial, and industrial service for the total United States, for each state and the District of Columbia, and for nine geographic regions are presented. The detailed information on bills for the three types of service in the individual communities as of January 1, 1978 is tabulated. The information on bills for residential service is supplemented with the latest statistics on average annual residential use of electricity in all large cities. Information is based on the 1970 US census data. (ERA citation 04:055102)

DOE/EIA-0056/1 PC **A03**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
National Electric Rate Book: Pennsylvania.
Apr 78, 34p

Rate schedules for electric service in communities of 2,500 or more for residential, commercial, and industrial services are presented for Pennsylvania. In addition to communities of 2,500 or more, all towns and villages with populations between 1,000 and 2,500 served under residential rate schedules available in the larger communities are listed. Rate schedules include customers for lighting, heating, power, and other purposes. Omitted are those applicable exclusively to resale service, railways, government bodies, agricultural, and rural service. (ERA citation 04:053334)

DOE/EIA-0074 PC **A03**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
National Electric Rate Book: Kansas.
May 78, 29p

Rate schedules for electric service in communities of 2,500 or more for residential, commercial, and industrial services are presented for Kansas. In addition to communities of 2,500 or more, all towns and villages with populations between 1,000 and 2,500 served under residential rate schedules available in the larger communities are listed. Rate schedules include customers for lighting, heating, power, and other purposes. Omitted are those applicable exclusively to resale service, railways, government bodies, agricultural, and rural service. (ERA citation 04:053338)

DOE/EIA-0101 PC **A02**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
National Electric Rate Book: Maine.
Jul 78, 11p

Rate schedules for electric service in communities of 2,500 or more for residential, commercial, and industrial services are presented for Maine. In addition to communities of 2,500 or more, all towns and villages with populations between 1,000 and 2,500 served under residential rate schedules available in the larger communities are listed. Rate schedules include customers for lighting, heating, power, and other purposes. Omitted are those applicable exclusively to resale service, railways, government bodies, agricultural, and rural services. (ERA citation 04:053344)

DOE/EIA-0104 PC **A02**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
National Electric Rate Book: Wyoming.
Jul 78, 12p

Rate schedules for electric service in communities of 2,500 or more for residential, commercial, and industrial services are presented for Wyoming. In addition to communities of 2,500 or more, all towns and villages with populations between 1,000 and 2,500 served under residential rate schedules available in the larger communities are listed. Rate schedules include customers for lighting, heating, power, and other purposes. Omitted are those applicable exclusively to resale service, railways, government bodies, agricultural, and rural service. (ERA citation 04:053345)

DOE/EIA-0110(78) PC **A02**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
National Electric Rate Book: New Jersey.
Aug 78, 12p

Rate schedules for electric service in communities of 2,500 or more for residential, commercial, and industrial services are presented for New Jersey. In addition to communities of 2,500 or more, all towns and villages with populations between 1,000 and 2,500 served under residential rate schedules available in the larger communities are listed. Rate schedules include customers for lighting, heating, power, and other purposes. Omitted are those applicable exclusively to resale service, railways, government bodies, agricultural, and rural service. (ERA citation 04:053346)

DOE/EIA-0112(77) PC **A02**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Sales of Asphalt in 1977.
Jul 78, 6p

Data are presented on sales of petroleum asphalt and asphaltic products by type and principal rise C1973-1977) and by P.A.D. District and state. (ERA citation 04:052551)

DOE/EIA-0133/76 PC **A02**/MF **A01**
Energy Information Administration, Washington, DC.
World Natural Gas: 1976.
12 Apr 78, 8p

Natural gas production by countries is presented in tabular form for the years 1972 through 1976. Data are also presented on natural gas used for repressuring or wasted and on world natural gas trade. (ERA citation 04:051121)

HCP/B8681-01/1 PC **A08**/MF **A01**
ICF, Inc., Washington, DC.
Technical, Institutional, and Economic Analysis of Alternative Electric Rate Designs and Related Regulatory Issues in Support of DOE Utility Conservation Programs and Policy. Volume I. Domestic Rate Survey.
May 79, 161p
Contract EM-77-C-01-8681

Certain electric rate structures currently offered or actively proposed by United States Class A and B utilities are reviewed, focusing on six major areas: (1) rates that apply to backup electricity for solar space and/or water heating systems; (2) rates that contain demand (kW) charges for residential customers; (3) rates that contain flat or flattened energy charges for residential customers; (4) rates to residential, commercial, and industrial customers who allow the utility to control part or all of their loads; (5) rates that apply to customers who cogenerate part or all of their electricity, and prices paid by the utility for purchases of cogenerated electricity from the customer; and (6) rates offered by energy-constrained electric utilities that rely primarily on hydropower. A discussion of each area is contained in Chapters II through VIII, respectively. Filed tariffs that pertain to the above six areas are identified throughout the text. Copies of these tariffs are provided in a separately bound Appendix. Appendix A presents the results of a survey by Edison Electric Institute on rate-structure innovation. Appendix B contains a survey conducted by ICF on time-of-day electric rates. (ERA citation 04:051822)

HCP/B8681-01/2 PC **A05**/MF **A01**
ICF, Inc., Washington, DC.
Technical, Institutional, and Economic Analysis of Alternative Electric Rate Designs and Related Regulatory Issues in Support of DOE Utility Conservation Programs and Policy. Volume II. Foreign Rate Survey.
May 79, 77p
Contract EM-77-C-01-8681

This volume contains a survey review of various electric rate structures offered by major utilities outside the US. Information is included from Australia, Canada, Finland, Israel, Japan, New Zealand, Norway, Sweden, United Kingdom, and West Germany. The survey focuses on the same six areas as the Domestic Survey (Vol. 1), namely: (1) rates that apply to backup electricity for solar space and/or water heating units; (2) rates that contain demand (kW) charges for residential customers; (3) rates that contain flat energy charges for residential customers; (4) rates to residential, commercial, and industrial customers who allow the utility to control part, or all, of their loads; (5) rates that apply to customers who cogenerate part or all of their electricity, and the prices paid by utilities for purchases of cogenerated electricity from these customers; and (6) rates offered by energy-constrained electric utilities that rely primarily on hydropower. Appendix A contains tariff schedules for selected utilities. All sources used in preparation of this volume are listed in Appendix B. (ERA citation 04:051823)

HRP-0029573/3 Not Available NTIS
American Nurses' Association, Washington, DC.
Containing Costs Through Prospective Reimbursement.
Carole P. Jennings, and Thomas F. Jennings.
1977, 5p
Pub. in American Jnl. of Nursing v77 n7 p1155-1159 Jul 77.

Prospective reimbursement and health care cost containment are examined from the standpoint of a nurse and an economist. Prospective reimbursement involves payment at a predetermined anticipated rate. It requires sound financial planning and should provide an incentive to administrators and health care personnel to find ways of reducing costs and delivering satisfactory care at an acceptable and reasonable price. Three general approaches to control health care cost inflation are cited: (1) make the market for health care resemble efficient markets in other sectors; (2) replace the economic market with a political market by nationalizing the health care industry; and (3) compensate for the poor market structure by the institution of public-utility-type regulation. By limiting the amount paid for a particular service or length of hospital stay, proponents of prospective reimbursement hope that hospital decisionmakers will be disciplined to keep further cost increases within that limit. Experiments in prospective reimbursement are noted, the effects of reimbursement on hospital behavior are explored, and the implications of prospective reimbursement for nursing are discussed. Particular attention is given to health systems agencies, professional standards review organizations, and the Patient Assessment and Care Evaluation tool (the first national effort to assess the quality of nursing care in skilled nursing and intermediate care facilities).

N80-10962/2 PC **A08**/MF **A01**
ECON, Inc., Princeton, N. J.
A Study of the Cost-Effective Markets for New Technology Agricultural Aircraft.
G. A. Hazelrigg, Jr., and F. Clyne. Sep 79, 161p
NASA-CR-159090
Contract NASW-2781

A previously developed data base was used to estimate the regional and total U.S. cost-effective markets for a new technology agricultural aircraft as incorporating features which could result from NASA-sponsored aerial applications research. The results show that the long-term market penetration of a new technology aircraft would be near 3,000 aircraft. This market penetration would be attained in approximately 20 years. Annual sales would be about 200 aircraft after 5 to 6 years of introduction. The net present value of cost savings benefit which this aircraft would yield (measured on an infinite horizon basis) would be about $35 million counted at a 10 percent discount rate and $120 million at a 5 percent discount rate. At both discount rates the present value of cost savings exceeds the present value of research and development (R&D) costs estimated for the development of the technology base needed for the proposed aircraft. These results are quite conservative as they have been derived neglecting future growth in the agricultural aviation industry, which has been averaging about 12 percent per year over the past several years.

PB80-106594 PC **A05**/MF **A01**
General Accounting Office, Washington, DC. International Div.
The U. S. Mining and Mineral-Processing Industry: An Analysis of Trends and Implications.
Report to the Congress.

31 Oct 79, 100p ID-80-04

The report on the declining U.S. mining and mineral-processing industry points out the specific impact of Government actions on the mineral industry and the need to improve the consideration being given to the consequences of Government actions and the resolution of conflicts between national policies to assure that the overall national interest is served.

PB80-107220 MF **A01**
Department of Commerce, Washington, DC.
Business America - The Journal of Industry and Trade. Volume II, Number 24, November 19, 1979.
Bi-weekly pub.
19 Nov 79, 49p
See also Volume 2, Number 22, PB-301 033.
Paper copy available from Supt. of Docs.

Contents:
- Foreign trademark protection for exporters;
- Commerce steps up enforcement of antiboycott law;
- 'Boatique America' continues to draw big crowds;
- New program guides minority firms into exporting;
- Domestic business report;
- Economic highlights;
- Business outlook abroad;
- Worldwide business opportunities.

PB80-108608 PC **A03**/MF **A01**
Rochester Univ., NY.
Economic Variation on the Navajo Reservation,
Stephen J. Kunitz. 1975, 29p NSF/RA/E-75/357
Grant NSF-GI-34837
Also pub. as Lake Powell Research Project, Los Angeles, CA. Contribution 24.

Previously published materials are used to show that the Navajo Reservation population is not a homogeneous tribe, as indicated by many investigators, but that it differs considerably in social organization, economic activities, and in mortality, fertility, and migration patterns. Some of the causes and consequences of these regional differences are suggested. The reservation now encompasses about 24,000 square miles in the Southwest and is about the size of West Virginia. Data used in this study is based mainly on studies done in the land management districts of the original reservation. Variables discussed in the report are displayed in tabular form. Some general observations show that in the eastern half of the reservation there is greater than average involvement in wage work; a higher than average income from commercial, agricultural, and livestock activities; a higher than average proportion of the population with livestock permits; and less than average over-grazing. In the western half of the reservation there is more overgrazing, more dependence on welfare, and a smaller proportion of the population is allowed to have livestock.

PB80-109192 PC **A07**/MF **A01**
International Downtown Executives Association, Roanoke, VA.
Analysis of Major Commercial Districts. Technical Report. Volume II.
Final rept.,
Nov 77, 132p HUD-0000240
Contract HUD-H-2517

This volume contains the data for each city used in the quantitative analysis of a sample of major commercial districts that were included in the study of trends and characteristics observed in major business districts. The tabular and graphic data cover city population; demographic composition; median family, household, and per capita income; employment in the commercial business district; citywide and Standard Metropolitan Statistical Areawide percent of employment in manufacturing and services; and assessed property value in the commercial business district and citywide. The sample for which data are reported includes 25 cities. Hypotheses that guide the general areas of inquiry are stated, and propositions related to each hypothesis are listed. One hypothesis states that there is a set of key factors to explain the vitality or nonvitality of commercial districts. Some of these factors are cultural facilities serving a region, office space, the population served by a major downtown department store, the addition of suburban retail space, proportion of minority - group residents in downtown area, per capita income of a city, the distance of downtown from a competing center, perception of crime in the downtown area, topography of downtown districts, and the centrality of the commercial business district in relation to the urban area. A second hypothesis states that there are a number of public and private policies which are successful in revitalizing commercial districts. Success in revitalizing commercial districts is related to the number of public dollars attracted per capita, strong political and business leadership, cooperative public and private planning, incentives to attract private capital, attraction of local investors, location of main local government offices in downtown, effective public transit system, improvement of adjacent neighborhoods, the availability of parking, and the development of malls in commercial districts.

PB80-109432 PC **A13**/MF **A01**
Federal Reserve Bank of Boston, MA.
New Mortgage Designs for Stable Housing in an Inflationary Environment.
Franco Modigliani, and Donald R. Lessard. Jan 75, 295p HUD-0000284

The articles in this book are papers presented at a conference entitled "New Mortgage Designs for Stable Housing in an Inflationary Environment," sponsored by the Federal Reserve Bank of Boston at the Massachusetts Institute of Technology (MIT) in January 1975. The conference was the culmination of a study conducted by the Sloan School of Management at MIT. Since all the papers are part of the same study, they reflect many of the same basic themes, and although only those responsible for each part of the study appear as authors, each paper reflects the contribution of the entire conference group. Discussions by particular individuals on the topics considered in each paper are also included. Subjects treated are inflation and the housing market, problems and potential solutions, solving the long - range problems of housing and mortgage finance, alternative mortgage designs, the relationship between the mortgage instruments, the demand for housing and mortgage credit, review of empirical studies, price - level - adjusted mortgages in Brazil, roll - over mortgages in Canada (i.e., interest rate is set for a 5 - year term, then the principal becomes due with the option of negotiating another 5 - year mortgage at new interest rates), financing of housing in Finland with special reference to the application of the index clause, price - level - adjusted mortgages in Israel, the case in Sweden, the case of the United Kingdom, mortgage innovation to facilitate investment in housing, experience with variable - rate mortgages, macroeconomic simulations of alternative mortgage instruments, and tax and regulatory problems posed by alternative nonstandard mortgages. Figures, tabular data, details of mathematical models, and references are included.

PB80-109713 PC **A06**/MF **A01**
RAND Corp., Santa Monica, CA.
Inflation in the Standard Cost of Adequate Housing: Site I, 1973-1976. Housing Assistance Supply Experiment.
Working note,
Ira S. Lowry. Mar 76, 120p HUD-0000381
Contract HUD-H-1789

Inflation in housing costs that occurred in Brown County, Wis., (Site I of the HUD Housing Assistance Supply Experiment) between 1973 and 1976 is analyzed, along with its effect on program benefits. The Experimental Housing Allowance Program was designed to enable participants with low incomes to afford the full costs of decent, safe, and sanitary housing by providing direct cash assistance for rent and utilities, but inflation has made the payment schedule obsolete, and program benefits are inadequate for program purposes. The analysis of inflation addresses two issues: (1) the extent of housing cost increases, and (2) the responsibility of the program itself for the increase in housing costs. Data sources were field surveys of renter households in Brown County, fuel and utility rate schedules obtained from local suppliers of these items, and administrative records of the allowance program. Results show that between 1973 and 1975, contract rents for housing in Brown County increased at an average annual rate of about 4 percent and gross rents increased at an average annual rate of about 6 percent. There were marked differences in inflation rates for different sectors of the rental market. Rates were higher for single - family homes than for apartments, higher for large units than for smaller ones, and higher for low - rent units than for high - rent units. Less comprehensive evidence for the period after February 1975 indicates that the identified pace and pattern of inflation are characteristic through 1976. Increases were due largely to higher prices for domestic fuels and utility services, and these prices have affected program participants even though their contract rents have remained stable. It is concluded that the program has had no discernible effect on inflation for housing in the county. Increases in benefits to participants are recommended to compensate for inflation as well as realignment of the benefit schedule for very small and large households. Supporting data are appended. (Author abstract modified).

PB80-109770 MF **A01**
Department of Housing and Urban Development, Washington, DC. Office of the Assistant Secretary for Policy Development and Research.
Methods of Urban Impact Analysis. No. 1: The President's Tax Program.
David Puryear, and Roy W. Bahl. 1979, 16p
HUD-0000390
Paper copy available from the Sup. of Docs., Stock number 023-000-00493-3

The probable impact of President Carter's tax program on housing, cities, and community development is analyzed in this paper. The $25 billion tax cut package for 1978 - 79 is designed to provide general stimulus for the economy and offset the impact of the increases in social security taxes. Proposed changes fall into three categories: personal tax cuts and reforms, corporate cuts and reforms, and a few special reforms. The most significant urban implications of the proposed package would be a reduction in resources available for Federal initiatives such as the President's urban policy package; an increase in the need for such new Federal initiatives because of the anticity bias of some of the tax cut provisions, principally the liberalization of the investment tax credit; the use of a tax to stimulate the economy which almost completely bypasses the poorest segment of the population, those with incomes so low they already pay no income taxes; and little change in the distribution of Federal tax burdens among income classes since the increased progressiveness of the personal income tax will be coupled with the recent increase in social security taxes. Housing will realize a relatively small stimulative effect, but the net effect of curtailing accelerated depreciation, liberalizing the investment tax credit, and the creation of non - real estate tax shelters may be to make multifamily housing slightly less attractive to investors. The interaction of these changes and the investment stimulus of the overall tax package, however, make it impossible to determine the magnitude of this effect. (Author abstract modified).

see individual report for order number and price
International Customs Tariffs Bureau, Brussels (Belgium).
International Customs Journal. Year 1979-1980.
Bulletins.
1979-80,open series
See also 15th Edition, PB-299 424.

The reports present authoritative information for exporters, importers, investors, manufacturers, and those concerned with international trade. They contain the schedules of customs duties and exemptions applicable to goods imported into or exported from the country. Other individual documents are also available:
- BULL-28. Japan. 15th ed, suppl-1, Aug 79, 27p, suppl. to PB-299 424, PC A03, MF A01 **PB80-112592**
- BULL-24. Spain. 14th ed, suppl-1, Jul 79, 92p, suppl. to PB-266 440, PC A05, MF A01 **PB80-112600**
- BULL-1. Switzerland. 13th ed, suppl-2, Sep 79, 34p, suppl. to PB-266 441, PC A03, MF A01 **PB80-112618**

BULL-26. Singapore. 7th ed, Jul 79, 46p, PC A03, MF A01 **PB80-112626**
BULL-11. Iceland. 8th ed, Sep 79, 188p PC A09, MF A01 **PB80-112634**

PB80-802770 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Production Planning and Scheduling. Volume 1. 1964-December, 1977 (A Bibliography with Abstracts).
Rept. for 1964-Dec 77,
Guy E. Habercom, Jr. Dec 79, 262p

The bibliography cites research on the planning and scheduling of industrial production. Operations research studies, time studies, ane automation studies for the solution to many production problems are included. (This updated bibliography contains 254 abstracts, none of which are new entries to the previous edition.)

PB80-802788 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Production Planning and Scheduling. Volume 2. January, 1978-November, 1979 (A Bibliography with Abstracts).
Rept. for Jan 78-Nov 79,
Guy E. Habercom, Jr. Dec 79, 125p
Supersedes NTIS/PS-78/1193, NTIS/PS-77/1074, NTIS/PS-76/0985, NTIS/PS-75/863, and NTIS/PS-74/124. See also Volume 1, 1964-December, 1977, PB80-802770.

The bibliography cites research on the planning and scheduling of industrial production. Operations research studies, time studies, and automation studies for the solution to many production problems are included. (This updated bibliography contains 119 abstracts, 62 of which are new entries to the previous edition.)

PB80-923600 Subscription
Food and Drug Administration, Rockville, MD.
Monthly Import Detention List.
Monthly repts.
1979, 12 issues
Paper copy available on subscription, North American Continent price $45.00/year; all others write for quote. Single copies also available in paper or microfiche.

The Food and Drug Administration's Monthly Detention List tabulates currently detained imported items such as foodstuffs and pharmaceuticals. The detentions are arranged by product code; sample number; the product; district and port of entry; manufacturers and shippers name, city, and country of origin; the primary and secondary reason for detention; and unit type, quantity, and value.

UT/CES-PS-4 PC **A05**/MF **A01**
Texas Univ. at Austin. Center for Energy Studies.
Financing the Future Growth of the Electric Power Industry.
M. L. Baughman, and D. P. Kamat. Sep 78, 90p

Capital requirements and financial prospects of the U.S. electric utility industry are assessed within the context of existing regulatory institutions as well as in response to a variety of possible changes in the way regulated electricity prices are determined in the U.S. In recognition of the possible financial difficulties that the electric utility industry may face if regulated prices are not set high enough to allow sufficient capital to be generated, a number of policy proposals have been made.The most direct way of dealing with the problem is simply to raise the allowed rate of return to a level greater than or equal to the cost of capital. Since 1976 this policy has been implemented to some extent through a combintion of large rate increases and declining interest rates, and the effects have been reflected by a large increase in the market value of most electric utility common stocks. A number of indirect policies for increasing revenues of the industry have also been proposed, such as the inclusion of construction work in progress (CWIP) in the rate base, increases in the investment tax credit, and the expensing of preferred stock dividends. This paper does not predict whether there will be a capital shortage or how large it will be. Rather, it shows that under reasonable assumptions a capital shortage is possible, then examines the relative effects that alternative regulatory reforms would have on such a capital shortage if it were to evolve. The analysis is carried out by using a regionalized engineering econometric simulation model of U.S. electricity supply and demand. (ERA citation 04:036718)

5D. History, Law, and Political Science

AD-A075 684/1 PC **A16**/MF **A01**
American Univ Washington Dc Center for Research in Social Systems
Human Factors Considerations of Undergrounds in Insurgencies.
Technical rept.,
Andrew R. Molnar , Jerry M. Tinker , and John D. LeNoir. Dec 66, 363p
Contract DA-49-092-ARO-7

The objective of this study is to describe, on the basis of existing empirical information and current state of knowledge, the organizational, motivational, and behavioral characteristics of undergrounds in insurgent movements and to relate these characteristics to the total revolutionary structure, mission, and operations. Particular emphasis has been placed on: (1) Describing underground organizations and relating them to the total insurgent organization. (2) Describing Communist uses of undergrounds and their role in Communist-dominated insurgencies. (3) Summarizing descriptive and empirical information on motives for joining, staying in, and defecting from underground organizations. (4) Describing certain underground administrative, psychological, and paramilitary operations, and noting the human factors which appear to be related to their success or failure. (5) Describing the organization and countermeasures used by governments to suppress or eliminate undergrounds.

AD-A075 818/5 PC **A05**/MF **A01**
Brookings Institution Washington D C
Mailed Fist, Velvet Glove: Soviet Armed Forces as a Political Instrument Manual.
Technical rept. 1 Jul 77-30 Sep 79,
Stephen S. Kaplan. 30 Sep 79, 99p
Contract N00014-77-C-0479, ARPA Order-2820
See also AD-A073 950 and AD-A073 951.

In 1979 a study titled Mailed Fist, Velvet Glove: Soviet Armed Forces as a Political Instrument was completed for the Defense Advanced Research Projects Agency of the U.S. Department of Defense. The study found between June 1944 and June 1979, Soviet armed forces were used on 187 occasions as a political instrument -- that is, as a means of influencing the decisions of foreign governments. This manual is designed to allow other researchers to make use of the data that were collected on these incidents. It includes an extended definition and discussion of the subject of the study, a list of the incidents, a description of the variables for which data were collected, the full data file, and a listing of sources. The data file and a control file containing a description of the variables and their values have also been placed on a computer tape. Information is provided about how copies of this computer tape may be obtained. (Author)

AD-A075 942/3 PC **A05**/MF **A01**
Army Military Personnel Center Alexandria Va
State-Military Relations in Brazil.
Final rept.,
Layton Gerald Dunbar. 25 Jul 79, 83p
Master's thesis.

Some recent literature on Latin American politics has described how the military-backed authoritarian regimes have used the powers of the state to subordinate and control civilian interest groups through corporatist state structures. The purpose of this thesis is to describe the strategies used by the Brazilian state to subordinate and control the military. A dual strategy of control is described in which the state first seeks to control the individual military officer by emphasizing the traditional military values of hierarchy, discipline, loyalty and patriotism and by selectively employing various coercive and co-optive measures. Secondly, the state seeks to increase its control over the military by restructuring its relationship with the institution in order to centralize and strengthen its formal authority over it. The thesis concludes with the contention that the Brazilian state has succeeded in significantly reducing the political role of the armed forces although this has generated tensions between the state and the military which have placed further strains on military cohesion. (Author)

AD-A076 009/0 PC **A03**/MF **A01**
Rand Corp Santa Monica CA
Soviet Leadership Politics and Leadership Views On The Use of Military Force.
Interim rept.,
W. M. Jones. Jul 79, 36p Rept no. RAND/N-1210-AF
Contract F49620-77-C-0023

The Soviet military doctrinal writings concerning war initiation emphasize the value of preemptive attacks in 'force carried through to the complete defeat of the enemy. The question is, 'Would this military doctrine agree with the desires of their political leadership as they contemplated the imminent initiation of a war' An examination of the histories of the various Soviet political leaders reveals a recurrent pattern. A dominent leader is replaced by a small group of collegial successors which, in turn, devolves into an intense competition ending only when one competitor has clearly established dominance. In the dominant leader phase, and in the early days of the collegial competition phase, the aspirants to the top position attempt to enhance their power by building and maintaining a coterie of proteges, at their opponents' expense.

AD-A076 122/1 PC **A15**/MF **A01**
Maryland Univ College Park Dept of Government and Politics
Cross-National Crisis Indicators Project.
Final technical rept. 1 Oct 77-30 Sep 78,
Gerald W. Hopple . Dec 78, 346p
Contract N00014-76-C-0153

The Cross-National Crisis Indicators (CNCI) Project was designed to enhance the crisis warning aspect of the Crisis Management Program of the Defense Advanced Research Projects Agency/Cybernetics Technology Office (DARPA/CTO). The CNCI Project emphasized the exploration, development, and preliminary testing of both indicator systems and models designed to facilitate conflict and crisis tracking and forecasting. The conceptual, theoretical, and empirical subtasks of the CNCI research program include: The refinement of the concepts of crisis, international crisis, and domestic crisis; The assembly of empirical indicator systems; The construction and elaboration of interstate and domestic crisis models; and The illumination of linkages between interstate and intrastate crises. The final chapter emphasizes the importance of 'crossing' levels of analysis and attempting to anchor crisis theory within a more general international relations theoretical edifice.

AD-A076 129/6 PC **A06**/MF **A01**
Army Electronics Command Fort Monmouth N J
False Arrest of Deserters: An Analysis of Immunity from Federal Civil Liability.
Final rept.,
John R. Bozeman. 8 Jun 79, 116p
Master's thesis.

This study discusses false arrest as a basis for liability in civil suits brought on the federal level, and examines the nature and scope of immunity available to protect state and local law enforcement officials, and their employers, from liability for false arrest in connection with deserter apprehension cases. The development of immunity doctrine in the decisions of the United States Supreme Court is analyzed together with trends identified in decisions of the lower federal courts as they have attempted to interpret the Supreme Court's guidelines. Conclusions drawn from these analyses are applied to issues presented by deserter apprehensions pursuant to 10 U.S.C. 808. The discussion developes the principal considerations which may affect liability in three federal civil damage remedies for false arrest: 42 U.S.C. 1983, the Fourth Amendment of the Constitution, and the Federal Tort Claims Act. The varying requirements for each remedy are analyzed by reference to potential defendants: police officers, their supervisors, municipalities, states, and the federal government.

AD-A076 157/7 PC **A06**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB Oh School of Engineering
Policy Capturing Exercise on Labor Arbitrators.
Master's thesis,
David W. Lambert. Sep 79, 110p Rept no. AFIT/GSM/SM/79S-8

Decision modeling techniques have been very successful in capturing the policies of a wide variety of decision makers. This study attempts to model the decisions of labor arbitrators so that the arbitration process can be better understood. Policy capturing provides a systematized way of examining the trade-offs between issues that an arbitrator has to make when granting an award. The issues this study examines are efficiency, fairness, effect on worker, clear language of the contract, past practice, negotiating history, and previous awards. The data for this study is collected by first reading the facts and arguments of an actual arbitration case and then assigning a score to each of the issues. This data is then analyzed using discriminant and regression analysis techniques.

AD-A076 318/5 MF **A01**
Caci Inc-Federal Arlington Va
Analysis of the United States, Soviet, and Chinese Crisis Management Experiences: Documentation.
Rept. for 1 Oct 78-30 Sep 79,
Robert B. Mahoney, Jr. , Janice Fain , and James McClave. 28 Sep 79, 378p Rept no. CAC0014
Contract N00014-77-C-0135, DARPA Order-2928
Availability: Microfiche copies only.

This report provides documentation for CACI's Executive Aids for Crisis Management. The documentation of these computer decision aids demonstrates the capacities of the aids, which were developed to assist Department of Defense crisis managers by providing them with ready access to the historical records of postwar U.S., Soviet, and Chinese crisis behaviors. These aids were significantly enhanced during FY79 by: Updating all data files through the end of calendar 1978; Adding a module containing information on the crises of concern to the People's Republic of China from 1949-1978; Adding a section that allows users to directly compare the characteristics, actions, objectives, and problems associated with crises of concern to both the United States and the Soviet Union; and Producing an aid component that presents the outcomes of Soviet and American crises from 1966-1978. The data file manipulation characteristics of the aids allow crisis planners to search rapidly for historical precedents and analogies in the course of considering crisis options. In noncrisis periods they can serve as instructional devices for crisis management personnel.

PB80-101108 PC **A04**/MF **A01**
State Legislative Leaders Foundation, Milwaukee, WI.
Institutional Change and Legislative Performance: A Seminar for Legislative Leaders, Palm Beach, Florida, August 20-23, 1978.
1979, 53p NSF/RA-790057

The seminar consisted of the following presentations: legislative change in retrospect; institutional change and legislative performance; evaluation and oversight; building high performance leadership; and managing the legislative process. Crisis management by the leadership was discussed.

PB80-108186 PC **A03**/MF **A01**
Council of State Governments, Lexington, KY.
Bail Bond Reform in Kentucky and Oregon,
Michael D. Kannensohn, and Dick Howard. 1978, 41p RM-645, NSF/RA-780649
Grant NSF-ISP77-16111

Revised bail laws in Kentucky and Oregon are reviewed to illustrate different approaches to bail reform. Kentucky's law abolishes commercial bail bonding and replaces it with a statewide pretrial release program. The Oregon approach also is designed to eliminate the professional bondsman, but it is directed more toward changing the conditions of pretrial release than the Kentucky law. The laws of both states are based on the philosophy that a defendant's opportunity to be released prior to trial should not be based on ability to post bail. Administrative and operational aspects are discussed.

5E. Human Factors Engineering

AD-A076 208/8 PC **A06**/MF **A01**
Naval Ocean Systems Center San Diego Ca
Models and Mockups as Design Aids.
Technical document,
N. J. Buchaca. 1 Jul 79, 109p Rept no. NOSC-TD-266

This report describes the application of models and mockups as design aids in initially determining or improving control panel layouts and equipment/compartment arrangements to facilitate interactions between personnel and personnel and equipment during system operations and maintenance. The report describes how these models and mockups (M and M) have been used, types of M and M and their applications in various phases of the design development cycle, and finally, a description of the use of M and M for man-machine design and design improvements. Three appendices are included in the report and contain: An M and M Characteristics Checklist to aid in the preparation of M and M specifications, Examples of M and M Specifications, and Descriptions of NOSC M and M Applications. (Author)

AD-A076 254/2 PC **A06**/MF **A01**
Oceanautics Inc Annapolis Md
Luminance Requirements and Color Appearances of Colored Displays in Turbid Water. II. Illuminated Ambient Viewing Environments.
Technical rept.,
W. S. Vaughn, Jr. , Robert A. Glass , and Jerome Williams. May 79, 110p
Contract N00014-74-C-0276
See also Part 1, AD-A068 399.

Ten light-adapted observers viewed six narrowband wavelength displays and a white display through two artificially turbid and illuminated water media. The two water samples were intended to simulate the ambient underwater environment of a near-shore ocean at 20 meters depth and an inshore harbor or bay at 5 meters depth when surface illumination was full sunlight, 10,000 ft-candles. The 'Ocean' simulation was composed of a low concentration of relatively large-sized suspensoids illuminated by 17 ft-candles of light spectrally restricted to the green region, 540 nm peak wavelength. The 'Harbor' simulation was composed of a high concentration of relatively small-sized particles in suspension and illuminated by 214 ft-candles of light spectrally restricted in the yellow region, 600 nm peak wavelength. Against these two backgrounds, observers viewed 2-digit, self-luminous displays which varied in size and color. Observers controlled display luminance to three magnitudes defining three levels of display legibility: 'Minimum', 'Clear' and 'Limit'. At each legibility criterion, observers described the color appearance of the display using a forced-choice, color-naming technique and a restricted set of color-name alternatives: blue, green, yellow, red and white.

5F. Humanities

BNL-26128 PC **A03**/MF **A01**
Southern Illinois Univ., Carbondale.
Thematic and Compositional Variation in Palenque-Region Incensarios.
R. L. Rands, R. L. Bishop, and G. Harbottle.
1978, 43p CONF-7806150-1
Contract EY-76-C-02-0016
Tercera mesa redonda de palenque, Pebble Beach, CA, USA, 11 Jun 1978.

Ceramic incensarios were an important component of ritual paraphernalia in the Palenque region. Tubular flanged cylinders - stands or supports for receptacles in which the incense was actually burned - were highly embellished. The primary concern is with these iconographically-rich objects, focusing on variations in thematic presentation and in paste composition. The latter, mineralogical and chemical composition, has significance in that it enables differentiation among centers of production, leading to a better understanding of where clay resources were procured and, inferentially, where the incensarios were manufactured. An attempt is being made to determine if incensarios of Palenque style were manufactured at a single or at multiple sites, if Palenque itself was a production center, and what can be inferred about trading or distributional patterns of these specialized objects. (ERA citation 04:053470)

DOE/SR/01072-1 PC **A05**/MF **A01**
South Carolina Univ., Columbia. Inst. of Archeology and Anthropology.
Intensive Archeological Survey of a Potential Independent Spent Fuel Storage Facility, Savannah River Plant, Aiken and Barnwell Counties, South Carolina. Research Manuscript Series 141.
G. T. Hanson, and R. D. Brooks. Dec 78, 88p
Contract EW-78-S-09-1072

Purpose of this survey of the proposed ISFSF area in the SRP area was to provide a complete inventory and evaluation of the archeological resources within the 550-acre parcel. Eight previously unrecorded sites were found during the survey, with only one occurring within the main construction area. Three sites showed evidence of prehistoric occupations while the remaining sites were attributable to the historic period. Only three sites were considered to be eligible for the National Register of Historic Places. It is recommended that the construction area for ISFSF be cleared for archeological purposes and that the three eligible sites be mitigated from any adverse effects. (ERA citation 04:048186)

5H. Man-Machine Relations

AD-A076 017/3 PC **A09**/MF **A01**
Perceptronics Inc Woodland Hills Calif
A Framework for the Development of an Improved Tactical Symbology.
Annual technical rept. 16 Mar 78-15 Mar 79,
Donald S. Ciccone , Michael G. Samet , and James B. Channon. Aug 79, 197p PATR-1063-79-4/1, ARI-TR-403
Contract DAHC19-78-C-0018

The utility of symbology would be increased by making it more compatible with current and emergent tactical doctrine. A structured method based on a role-playing exercise was developed for eliciting graphically related tactical information requirements from experienced military tacticians. The method, involving a 2-stage elicitation process, uses doctrinally-sanctioned information-processing guidelines to prompt participants to generate task-related tactical questions (e.g., What is the principal deficiency of a specific enemy unit) and candidate answers (e.g., mobility, personnel). A pilot test used two experienced staff officers and a European defensive scenario. The numerous question and answer sets obtained were organized into 22 clusters (i.e., data structures), with each one specifying questions in decreasing order of detail according to a common tactical theme (e.g., immediate threat, enemy vulnerability, priority targets). These data structures represent categories of task-based information requirements which can serve as potential building blocks in the development of a dynamic, flexible database for tactical symbology. The framework also contains a preliminary analysis of symbol design effectiveness based on a taxonomy of basic information-processing behaviors, which include symbol discrimination, display search, and symbol learnability.

AD-A076 048/8 PC **A02**/MF **A01**
Ohio State Univ Columbus
Tactual Discriminability of Two Knob Shapes as a Function of Their Size.
Technical rept.,
A. D. Swain , A. N. Chambers , W. C. Biel , and G. A. Eckstrand. Jan 52, 20p WADC-TR-52-7
Contract AF 33(038)-15474

In order to obtain data concerning the minimum size requirements for adequate tactual discriminability of the wheels and flaps airplane control knobs, five groups of 20 subjects each performed a task which required that they discriminate tactually between these two knob shapes. Subjects were allowed to view a knob shape presented in an aperture for about two seconds. Immediately following this they were required to grasp a lever con-

taining one of the two knob shapes. The subject was to 'operate' the lever if he thought that the knob shape sampled tactually was the same as the one viewed but was to remove his hand without moving the lever if he thought it was different. Five different knob sizes were used and each of the five groups performed the discriminative task with one of the different knob sizes. The major dimension of the knobs used varied in 1/4 inch steps from 1 inch through 2 inches. Each subject made 48 discriminations. Analyses were made of (1) average number of initially correct responses for each group, (2) average response time for initially correct responses for each group, and (3) average time required to make 48 correct responses for each group. None of these analyses revealed any statistically significant differences among the five knob size groups.

AD-A076 211/2 PC **A03**/MF **A01**
National Research Council Washington Dc Committee on Hearing Bioacoustics and Biomechanics
The Multiple Position Letter Sorting Machine. An Evaluation of Visual, Auditory, and Human Factor Problems.
1979, 39p
Contract N00014-79-C-0060

This report reviews and comments upon studies proposed by a U.S. Postal Service task force concerned with reducing operator error rates and improving job satisfaction with the Multiple Position Letter Sorting Machine (MPLSM). The major recommendation of the report is that the Postal Service study the feasibility and cost-benefit effectiveness of: (1) changing MPLSM operation from machine pacing to operator pacing; (2) providing an error key to enable operators to correct mistakes they themselves detect; (3) providing on-line feedback on personal performance to operator; and (4) rewarding operators who achieve low error rates. The importance of establishing an adequate system for measuring baseline error rates is emphasized. The report also considers the structure of the work environment, including visual and auditory factors, and explores the possibility of complete automation of the sorting system. (Author)

PAT-APPL-6-008 675 PC **A02**/MF **A01**
Department of the Army Washington DC
Optical Indexing System.
Patent Application,
Irving H. Weismann, Bernard Strauss, David George, and Harold Wakely. Filed 2 Feb 79, 6p
AD-D006 390/9
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A T.V. camera, mounted on the arm of a teleoperator remotely controlled grasping hand, is used to view an object to be grasped through an in-line semi-reflective mirror and a laterally disposed reflective mirror. Alignment of the teleoperator with the object is indicated by a single superimposed image of the object on the television viewing screen. Non-alignment of the teleoperator hand and the object is indicated by double images. (Author)

5I. Personnel Selection, Training, and Evaluation

AD-A075 656/9 PC **A02**/MF **A01**
Army (3rd) Fort Mcpherson Ga
The Primacy of the Soldier in Modern War.
27 Jan 80, 18p

All of the foregoing lends emphasis to the proper training and discipline of the man in uniform, and to his vital importance in modern warfare, whether he is going to be involved in an atomic war or a small brushfire campaign. As new weapons and vehicles come into use and the Army becomes more and more mechanically-minded, every man may have to learn a certain number of new techniques of an engineering and mechanical nature. But through it all, regardless of how much specialization may take place, basic soldiers are the standard-bearers for their country and upon their shoulders rests the nation's confidence in a secure future. (Author)

AD-A075 660/1 PC **A07**/MF **A01**
Transportation Systems Center Cambridge Ma
Validation of Air Traffic Controller Workload Models.
Final rept. Feb 78-Apr 79,
A. Robertson , M. Grossberg , and J. Richards.
Sep 79, 127p TSC-FAA-79-14, FAA/RD-79/83

During the past several years, computer models have been developed for off-site estimation of controller's workload. The inputs to these models are audio and digital data normally recorded at an Air Route Traffic Control Center (ARTCC). This report summarized the results of a study to validate the models at the Chicago ARTCC. For validation purposes, two additional estimates of workload were used. One estimate consisted of journeyman controllers observing peer controllers during actual operations and assigning workload ratings. A second estimate of workload was obtained from a survey of controllers based on past experiences working the sectors. During this time, audio and digital data were collected and then processed off-line for inputs to the controller workload models. The models were then used to estimate controller workload. A high degree of correlation was found between the model's estimated workloads and controller's estimates of workload. Based on this validation study, it is concluded that the models can be used to provide an index of controller workload and as a prediction of controller workload as a function of traffic. (Author)

AD-A075 662/7 PC **A03**/MF **A01**
Advanced Research Resources Organization Washington DC
An Exploratory Investigation of the Skill Qualification Testing System.
Final rept. 1 Jun 77-31 May 78,
Veronica F. Nieva , David Myers , and Albert S. Glickman. Jul 79, 44p ARI-TP-390
Contract DAHC19-77-C-0032

In December 1977, semi-structured interviews were conducted with 52 enlisted men at Fort Polk, Louisiana. The interviews were designed to provide information on user reaction to the various components of the Skill Qualification Test (SQT) system: the Soldiers' Manual, the SQT notice and the test itself. They are also designed to uncover information about the way in which the SQT system was operating and SQT-related activities on post. Results of the interviews are discussed and suggestions for improving various elements of the testing system are presented. (Author)

AD-A075 663/5 PC **A03**/MF **A01**
Human Sciences Research Inc Mclean Va
Improved Army Training and Evaluation Program (ARTEP) Methods for Unit Evaluation. Volume VI. Conventional ARTEP Missions and Engagement Simulations: An Examination of Options.
Final rept. 31 Jan 78-30 Apr 79,
M. Dean Havron , Leslie H. McFarling , and Robert G. Wanschura. Apr 79, 29p ARI-TR-79-A24
Contract DAHC19-77-C-0001
See also Volume 1, AD-A064 271.

Differences between the philosophies and procedures of engagement simulation training methods and conventional ARTEP field exercises generate several issues if both are to be integrated into exercises where unit performance measurement and unit evaluation is desired. This report examines four issues: development of accurate, comprehensive criteria and measures of unit tactical performance; structure and functions of evaluator/controller teams for data collection and performance rating; reduction/integration of ES-generated data and conventional ARTEP Test and Evaluation Outline data; and use of collected data to establish training objectives and assess progress in training program. Primary audiences for this report are researchers and TRADOC personnel responsible for development of ES and ARTEP training/evaluation methodologies. (Author)

AD-A075 682/5 PC **A02**/MF **A01**
Army (3rd) Fort Mcpherson Ga
Troop Topic: 'Chief Joseph - Lesson in Leadership and Discipline'.
19 Sep 62, 22p

One of the most celebrated names in Indian history is that of Chief Joseph of the Nez Perce -- a man whose character and military strategy have long been chronicled in the annals of the Old West, related around campfires, and recorded by Army officers and other writers of military history. The Nez Perce Indians were given their name -- which meant 'pierced noses' -- by the French, from the fact that in the early days of their tribal history they worn rings in their noses. At the time the white people of the United States began their association with this tribe, 'Old Chief Joseph', father of the celebrated Chief Joseph of the Nez Perce, was its leader. The tribe occupied a beautiful area in what is now Oregon, Idaho and Washington. This Troop Topic discusses the Nez Perce tribe, their country, and their leader; the events leading to the war between the United States and the Nez Perce; the tribe's heroic retreat to immortality; and the outstanding leadership displayed by their chief during this retreat.

AD-A075 688/2 PC **A06**/MF **A01**
Army Infantry School Fort Benning Ga
Haines Board: A Review of Army School System for Officer Education and Training. USAIS Position. Volume I and Factual Data. Volume II.
Jul 65, 122p

The United States Army Infantry School has reviewed guidance provided the board of officers (Haines Board) appointed by the Assistant Chief of Staff for Force Development to perform a comprehensive review of the Army's system for officer education and training. This paper considers those areas of guidance furnished the Haines Board which have a direct bearing on the USAIS mission, or in which USAIS has a fixed interest.

AD-A075 697/3 PC **A09**/MF **A01**
Army Infantry School Fort Benning Ga
Infantry Instructors' Conference Report, 6-11 June 1955.
1955, 182p

The Infantry Instructors' Conference was convened to standardize Infantry doctrine, tactics and technique taught at schools of the Army Educational System. (Author)

AD-A075 698/1 PC **A08**/MF **A01**
Army Infantry School Fort Benning Ga
Infantry Instructors' Conference Report, 23-27 June 1958.
1958, 172p

The Infantry Instructors' Conference was convened to standardize Infantry doctrine, tactics, and technique taught at schools of the Army Educational System. (Author)

AD-A075 699/9 PC **A10**/MF **A01**
Army Infantry School Fort Benning Ga
Infantry Instructors' Conference Report. 13 - 17 July 1959.
1959, 223p

The Infantry Instructors' Conference was convened to standardize Infantry doctrine, tactics, and technique taught at schools of the Army Educational System. (Author)

AD-A075 700/5 PC **A11**/MF **A01**
Army Infantry School Fort Benning Ga
Leadership Conference, CONARC 1973: Training to Lead, 14-18 May 1973.
Conference rept.
1973, 227p

The first purpose is to try to consider the future requirements of Army leadership. The second purpose is to exchange ideas and information relevant to Army leadership and management programs of instruction throughout the service school system. The third purpose of this conference is to examine current leadership doctrine and the direction of Army leadership. The fourth and final purpose is interrelated with the background of the first three steps--to be able to revise and come up with programs of instruction for leadership that would be applicable for training future leaders.

AD-A075 701/3 PC **A09**/MF **A01**
Army Infantry School Fort Benning Ga
Infantry Instructors' Conference Report. 11 - 15 July 1960.
1960, 188p

Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

The mission of the Infantry Instructors' Conference was: (a) To exhibit an active and constructive interest in Infantry Instructors at other service schools as primary representatives of the US Army Infantry School. (b) To bring Infantry Instructors abreast of the latest equipment, thinking and trends in the Infantry. (c) To become informed of and to discuss Infantry Instructors' problems on an individual and collective basis.

AD-A075 702/1 PC **A08**/MF **A01**
Army Infantry School Fort Benning Ga
Infantry Instructors' Workshop: Report of Conference. 17 - 20 August 1965.
1965, 166p

The Infantry Instructors' Workshop was convened to standardize Infantry doctrine, tactics, and techniques taught at other service schools. It was designed to inform Infantry Instructors of the latest equipment, thinking, and trends in the Infantry; and to discuss Infantry Instructors' problems on an individual and collective basis. (Author)

AD-A075 703/9 PC **A04**/MF **A01**
Army Infantry School Fort Benning Ga
Civilian Educational Survey Conference Held on 15-19 August 1966 at Fort Benning, Georgia.
Final rept.,
William E. Smith , and John G. Pappageorge. 21 Oct 66, 70p

The primary purpose of the conference was to bring together a group of civilian educational experts who could look at various aspects of the instructional system and give the school their thoughts on how operations might be improved. A secondary purpose was to establish closer rapport with the civilian educational community. (Author)

AD-A075 705/4 PC **A10**/MF **A01**
Army Infantry School Fort Benning Ga
Infantry Instructors' Conference. 15-19 July 1963.
1963, 221p

The Infantry Instructors' Conference was convened to standardize Infantry doctrine, tactics, and techniques taught at other service schools. It was designed to: inform Infantry Instructors of the latest equipment, thinking, and trends in the Infantry; and to discuss Infantry Instructors' problems on an individual and collective basis. (Author)

AD-A075 708/8 PC **A05**/MF **A01**
Army Safeguard System Evaluation Agency White Sands Missile Range NM
Initial CATTS Cost Effectiveness Tree.
Gilbert L. Neal. May 74, 78p Rept no. SAFSEA-MEMO-TC-1-74

This memorandum documents the development of a cost/effectiveness (C/E) descriptor tree which was developed in support of Operational Tests 1 planning for Device 16A3, Combined Arms Tactical Training Simulator (CATTS). The C/E tree was developed as part of a planned SAFSEA six man-month technical assistance effort to the CATTS Program Director. A C/E tree is a variant of performance descriptor hierarchy methodology in which a taxonomy of measurable system elements is developed down to measurable data elements. A performance descriptor hierarchy considers only system performance elements while a C/E tree considers both performance and cost elements (similar to a Value Model). The 'tree' is designed and constructed to be used as a system evaluation tool. It is an effective evaluation tool because it provides a framework for structuring an evaluation methodology.

AD-A075 717/9 PC **A06**/MF **A01**
Army Military History Research Collection Carlisle Barracks Pa
The Volunteer Army: A Military History Research Collection Bibliography.
Special bibliographic series no. 5,
John Slonaker. May 72, 111p

Publication of the special bibliography series of the US Army Military History Research Collection has had the primary purpose of providing information regarding the holdings of the Research Collection to the scholar and historian. It must be emphasized that this bibliography is not intended to be a definitive listing of bibliographic references on the subject; it is restricted to those materials physically incorporated in the Military History Research Collection at Carlisle Barracks, Pennsylvania.

AD-A075 724/5 PC **A06**/MF **A01**
Army Infantry Center and Fort Benning Ga
Modern Volunteer Army-1972.
Semi-annual evaluation rept. FY 73.
31 Jan 73, 107p
Original contains color plates: All DTIC and NTIS Reproductions will be in black and white.

This is a summary report of the November 1972 administration of the Fort Benning Project VOLAR Evaluation Questionnaire. This questionnaire was administered in its initial form in Novemeber 1970, prior to the implementation of VOLAR actions at Fort Benning.

AD-A075 725/2 PC **A99**/MF **A01**
Army Infantry Center and Fort Benning Ga
Modern Volunteer Army Experiment-1972.
Final evaluation rept. 1 Jan 71-30 Jun 72.
Jul 72, 747p
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

An overall analysis of the VOLAR experiment reveals that actions implemented pursuant to the experiment have caused massive positive changes in attitudes toward the Army, in expressed career intentions in actual reenlistment performance, and in the Army's accession system.

AD-A075 726/0 PC **A22**/MF **A01**
Army Infantry Center and Fort Benning Ga
Modern Volunteer Army Experiment.
Semi-annual evaluation rept. 1 Jan-31 Dec 71.
Jan 72, 525p
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

The present report contains the results of the second major evaluation of VOLAR actions at Fort Benning, but without the comparison with a control post. The primary reason for deletion of the control post from this evaluation, and from all future evaluations, is that Project VOLAR actions were directed to be implemented at that post at the end of FY 1971, so that it could no linger serve as a control post. (It was felt that the desirable effects of implementation of VOLAR at that post would far outweigh the loss of the post for control purposes). Consequently, the present evaluation and all future Fort Benning evaluations will consist basically of comparisons between Fort Benning's earlier data collections and data recently collected concerning attitudes of soldiers toward (1) the Army as a career (2) the four broad attitude areas identified earlier (pride in service, security, leadership, and reduced inequities), and (3) specific VOLAR actions implemented at Fort Benning.

AD-A075 730/2 PC **A04**/MF **A01**
Air Force Occupational Measurement Center Randolph AFB Tx
AGM-69A Missile Analyst and Missile Electronic Equipment Career Ladder. AFSCs 316XOT/316X2T.
Occupational survey rept.
Oct 79, 64p

This is a report of an occupational survey of the AGM-69A Missile Analyst (AFS 316XOT) and Missile Electronic Equipment (AFS 316X2T) specialties completed in September 1979. The 316XOT personnel are responsible for maintaining the AGM-69A (SRAM) missile system, and the 316X2T personnel maintain the electronic equipment utilized by the 316XOT personnel. The current project was designed to answer requests from the field concerning tasks performed by AFSC 31650T/31652T personnel. Topics discussed in this report include: (1) survey methodology, (2) job structure within the two ladders, (3) an analysis of skill level groups including a comparison of the two ladders, and (4) a comparison of the current survey with the previous survey.

AD-A075 731/0 PC **A03**/MF **A01**
Air Force Occupational Measurement Center Randolph AFB Tx
Metals Processing Career Ladder. AFSC 472X4.
Occupational survey rept.
Sep 79, 40p

This is a report of an occupational survey of the Metals Processing specialty (AFS 427X4) completed during August 1979. Incumbents in the 427X4 specialty weld, heat treat, cut, clean, and surface different metals and materials while repairing and fabricating components of Air Force equipment. Historically, the Metals Processing specialty has had several AFS designations through the years. The current job primarily involves in-shop, aircraft-related metal processing and welding tasks. Formal training is required for everyone entering this specialty. This report addresses the following areas: (1) development and administration of the current survey instrument; (2) the job structure identified in the 427X4 specialty and related skill level groups; and (3) comparison of CONUS/Overseas occupational data.

AD-A075 754/2 PC **A06**/MF **A01**
Army Command and General Staff Coll Fort Leavenworth Ks
Roles and Missions of Airborne, Ranger, and Special Forces in Contingency Operations.
Final rept.,
Charles D. McMillin. 8 Jun 79, 110p
Master's thesis.

This thesis addresses the roles and missions of U.S. Army airborne, ranger, and special forces in rapid reaction contingency operations. The study focuses on the requirements for and the missions appropriate for each of these elite units within the context of the more likely 'half war' contingency of the nations's 'one-and-a-half-war' strategy. Specifically examined are historical perspectives, current organization, mission and capabilities, as well as deployment and employment concepts. (Author)

AD-A075 786/4 PC **A10**/MF **A01**
Army Training and Doctrine Command Fort Monroe Va
Job and Task Analysis Handbook.
Final test rept.,
Bradford L. Walton , and Robert R. Begland. 13 Jul 79, 217p Rept no. TRADOC-PAM-351-4(T)

This handbook provides a ready reference in the day-to-day activities of a job/task analyst. It provides the analysis information in an organized way that was only described before in very general terms. Each chapter describes in detail its respective theme of the analysis process, and has a foldout at the end of the chapter that outlines the major points and delineates any sequential activities. The handbook describes the specific details of job/task analysis and the selection of tasks for training. It is a companion 'how to' document to TRADOC Reg 351-4 which defines the management requirement and procedures. Included are auxiliary appendices that describe processes which occur closely together with analysis, i.e. Site Selection, Job Performance Measures, Job Aids and Learning Hierarchy. A task analysis worksheet is also provided as an organizing job aid for the job/task analysis. (Author)

AD-A075 848/2 PC **A12**/MF **A01**
Naval War Coll Newport Ri Center for Advanced Research
USMC System Synthesis in Support of the Selection Process,
Dan B. Cone , and Doyle E. Stout. Jun 79, 273p

The objective of this study is to define the man/machine point of interface and the required definition of the program to synthesize the MMS/JUMPS (Manpower Management System/Joint Uniform Military Pay System) and the MAPR (Marine Automated Personnel Records System) system capabilities, as necessary, to fulfill unique processing requirements for special application.

AD-A075 894/6 PC **A07**/MF **A01**
Center for Naval Analyses Alexandria Va
The Expanded Sea/Shore Rotation Model,
Donald Maurer. May 79, 142p Rept no. CRC-381

Contract N00014-76-C-0001
See also Rept. no. CNA-RESEARCH-CONTRIB-380.

This guide describes a dynamic model which simulates personnel flows in a Navy detailing community. Using historical accessions, continuation rates and promotion probabilities, the model projects an initial inventory to future periods. In each projection period the historical data can be updated to reflect possible changes. Sea/shore rotation patterns can be altered to produce a desired personnel distribution between sea, shore and neutral duty. All computer programs are listed, and some flow charts are provided. A steady-state rotation model is described in CNA Research Contribution 380. (Author)

AD-A075 957/1 PC **A99**/MF **A01**
Training Developments Inst (Army) Fort Monroe Va
Job and Task Analysis Course. Volumes I through VIII.
Interim rept.,
Jerry Hale , Steve Prelewicz , and Bradford Walton. 27 Aug 79, 669p

This course provides an introduction to job/task analysis which focuses on basic skills necessary to Army TRADOC Analysts. The package is primarily designed for the novice or apprentice analyst. However, it will also serve as a useful training/refresher tool for experienced analysts. Further, the package will provide a quick introduction to newly assigned managers in analysis, design/development, and training evaluators to acquaint them with the job/task analysis process. (Author)

AD-A075 974/6 MF **A01**
Army Training Developments Inst Fort Monroe Va
Proceedings of the TRADOC Chiefs of Analysis Seminar Held in Newport News, Virginia on 14-16 August 1979.
3 Oct 79, 389p
Availability: Microfiche copies only.

The Seminar theme was Soft Skill Analysis, however, other related topics were also treated. The sponsor of this seminar was the Occupational Research and Analysis Division of Training Developments Institute, Fort Monroe, VA 23651. The intent of the seminars is to permit the service schools and invited speakers to present their opinions on varied subjects in order to enhance the Army's job/task analysis efforts.

AD-A075 991/0 PC **A02**/MF **A01**
Wright Air Development Center Wright-Patterson AFB Oh
Studies in Cue Utilization Behavior. Part 1. The Influence of a Relevant but 'Unused' Cue in Training Upon Transfer in a Positive Transfer Situation.
Technical rept.,
Gordon A. Eckstrand. Apr 52, 24p Rept no. WADC-TR-52-79-PT-1

In a training device or simulator an attempt is made to provide the primary stimulus cues which exist in the operational equipment or situation for which the student is being trained. In a simulator, however, additional or secondary cues may be introduced unintentionally which the student can use to obtain successful performance. If such secondary cues are available and used by the student, will he also learn to use those which are primary and must be relied upon in the operational situation. In four separate experiments directed toward this question subjects learned, on the basis of a secondary cue, a task which also contained a 'primary' cue. They were then forced to perform the task on the basis of the 'primary' cue alone. Their performance was compared with that of subjects who had not experienced the 'primary' cue during learning. The results of these experiments support the hypothesis that little or nothing is learned about performing a task on the basis of the 'primary' cue while learning is occurring on the basis of a secondary cue. The results point-up the potential inadequacy of any training device which permits successful performance in the device on the basis of cues other than those which permit successful performance in the operational situation. (Author)

AD-A076 014/0 PC **A03**/MF **A01**
Admiralty Marine Technology Establishment Teddington (England)
Personalised Task Representation.
Technical memo.,
R. Gregory. Jul 79, 31p AMTE(E)-TM79103, DRIC-BR-69898

Personalised Task Representation is a system of task analysis that is being developed at AMTE/APU. A worked example of the current PTR system is demonstrated and its rationale and relationship to the more traditional forms of task analysis are discussed. The most important difference between PTR and these other forms of analysis is that it provides the means to take account of the reasons for, and the contexts of, task activities as well as the task activities themselves. PTR thus emphasises the experiential as well as the behavioural components of the task. It is suggested that PTR has the potential to cope with tasks having a high non-procedural content, (eg tactical decision making), where other forms of task analysis break down. (Author)

AD-A076 132/0 PC **A04**/MF **A01**
Army Research Inst for the Behavioral and Social Sciences Alexandria VA
Effects of Refresher Training on Job-Task Typewriting Performance.
Technical rept.,
Joseph D. Hagman , and Joel D. Schendel. Oct 79, 71p Rept no. ARI-TR-410

Two groups of 15 Administrative Specialists, 71L Military Occupational Specialty (MOS), participated in four job-task refresher training sessions designed to enhance the typewriting of miltary correspondence. One group performed under a study training method which allowed use of a Correspondence Manual while arranging materials into the correct format. The other group performed under a recall training method which required reliance on memory rather than the Correspondence Manual for format information. Under both methods, soldiers received knowledge of results concerning both typewriting speed and accuracy. Straight-copy typewriting performance also was measured at each training session. Both training methods produced approximately a 36% increase in format arrangement speed without an associated increase in error. These benefits occurred regardless of a soldier's time in MOS or on-the-job typewriting experience. Straight-copy typewriting performance remained at an average level of 23 net words per minute across sessions and did not reflect job-task typewriting proficiency. Timely and consistent use of knowledge of results was suggested to be the reason for the typewriting improvements obtained under both training methods.

AD-A076 233/6 PC **A05**/MF **A01**
Rand Corp Santa Monica CA
A Sequential Analysis of the Air Force Officer's Retirement Decision.
Interim rept.,
Glenn A. Gotz , and John J. McCall. Oct 79, 89p Rept no. RAND/N-1013-1-AF
Contract F49620-77-C-0023

A stochastic dynamic programming model that explicitly examines the incentives to retire from the military is developed and numerically evaluated. The dynamic program includes the most significant institutional factors affecting an Air Force Office's retirement decision; actual data on promotion probabilities, officer's pay and allowances, and retirement pay are embedded in the model. The note is a progress report; research generalizing the model presented in this note will be presented in a future report. (Author)

AD-A076 234/4 PC **A07**/MF **A01**
Perceptronics Inc Woodland Hills CA
Applications of Adaptive Programming Technology (APT) to Command Group Training and Performance Improvement.
Final technical rept.,
Efraim Shaket , Moshe Ben-Bassat , Azad Madni , and Antonio Leal. May 79, 135p PFTR-1055-78-12, ARI-TR-79-A22
Contract DAHC19-77-C-0047

This report provides a feasibility analysis and evaluation of the application of Adaptive Programming Technology (APT) to the improvement of command group performance. The final high payoff application area recommended is a situation assessment aid for a division-level G2. APT technology is expected to provide a concept-oriented, interactive aid to integrate the large information volume available into a coherent global situation assessment. A 5-year development program is provided. (Author)

AD-A076 263/3 PC **A03**/MF **A01**
Human Resources Research Organization Alexandria VA
Functional Literacy Training Program for the National Guard.
Final rept.,
Lynn C. Fox , Wendy J. McGuire , John N. Joyner , and Steven L. Funk. Sep 76, 41p Rept no. HUMRRO-FR-WD-CA-76-15
Contract DAKF03-76-C-0130

This report describes the development, operation, and evaluation of a five-and-one-half-day, modified version of the Army's Advanced Individual Training Preparatory Training (AITPT) program for active duty National Guard personnel undergoing Advanced Individual Training at Fort Ord, California. The study describes the development and operation of the FLING school, including the modifications made to the AITPT program in order to accommodate it within the allotted time requirements. Program effectiveness is described both in terms of in-course performance data and pre-/post-training measures of student performance.

AD-A076 282/3 PC **A06**/MF **A01**
Georgia Inst of Tech Atlanta School of Industrial and Systems Engineering
A Model of a Manpower Training System with Applications to Basic Combat Training in the United States Army.
Master's thesis,
John Edward Miller. May 71, 108p
Contract DAHC04-70-C-0018

This thesis presents the development of a quantitative performance criterion for a training system which accepts input of varying quality and which contains multiple training events. The system may be operated such that each event has a probabilistic outcome. The cumulative probability of success for an event is a monotonically increasing function of time spent in that event. A decision rule is developed for determining the most efficient sequence of the multiple events. Some men have the capability to complete one or several of the multiple events more quickly than others (12). It is shown that if men are allowed to progress at their own speed through the training system, the average training costs per man are reduced.

AD-A076 284/9 PC **A06**/MF **A01**
Human Resources Research Organization Alexandria VA
Work Program for The Department of the Army, Fiscal Year 1973.
Dec 72, 109p
Contract DAHC19-73-C-0004

Activities in the HumRRO Work Program for the Department of the Army for FY 1973 have been grouped into six major Research Areas. These groupings, although not definitive or mutually exclusive, serve to indicate the nature of HumRRO work in relation to needs arising in major Army activities; they also serve to emphasize the interrelationships among HumRRO studies. A tabular summary of the Work Program showing the location, category, and amount of effort in each Research Area is presented in Section III, pages vi-viii. Work Units are indicated by code names, and Exploratory Research and Basic Research problems are identified by numbers. A total of 71.50 'basic man-years' has been allocated to the activities shown in the chart. The general scope of each Research Area and approximate amount of effort allocated to each are described.

ED-167 181 Not available NTIS
North Carolina State Dept. of Public Instruction, Raleigh. Div. of Educational Media.
Advisory List of Instructional Media for Social Studies.
1978, 64p
For related document, see ED-149 758.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corpo-

ration), Arlington, VA. 22210, PC$3.50, MF$0.83 Plus Postage.

Instructional media appropriate to school social studies programs are listed by type of media: books, films, filmstrips, filmstrip sets, pictures, cassette tapes, slide sets, and workbooks. Entries were selected from those materials submitted by publishers which received favorable reviews by educators, and range from primary to senior high school grade levels. Unannotated lists of material favorably reviewed in the indicated sources are attached. Entries include citation, price if available, grade level, and annotation. For additional materials, see the 1977 Advisory List.

ED-167 182 Not available NTIS
Cincinnati Univ., OH. Coll. of Community Services.
A Plan for Application of Telecommunications Satellites in Postsecondary Education.
31 Mar 78, 58p
Contract NIE-400-77-0105
Portions of this document are not fully legible. For related documents, see IR-007 073-075.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210, PC$3.50, MF$0.83 Plus Postage.

The proposed system for implementing new uses of telecommunication satellite technology is user-driven, addressing the needs of employed health personnel who would not otherwise have access to university resources, especially women, members of minority and disadvantaged groups, handicapped persons, and persons in rural areas. The plan, which builds upon the interactive capacity of the technology and its cost insensitivity to distance, is based upon a low-cost interactive audio and slow-scan video system utilizing ATS-1 or ATS-3, and designed to provide a transitional stage to meet current needs of user groups while preparing for crossover to utilization of a commercial satellite. Implementation would include establishment of an initial prototype network; expansion of the network to 13 ground stations located primarily in community health centers in several states; and possible cooperation and interface with the networks operated by the Appalachian Regional Commission and Department of Interior in the Pacific Trust territories to serve students in those areas. Initial programs include the University of Cincinnati external M.S. Program in Community Health Planning/Administration and a series of workshops and courses for health personnel. Appendices include supporting letters, status report of NASA experimental satellites, proposed receiving sites, and personnel vitae.

ED-167 183 Not available NTIS
Trenton State College, NJ.
Computers and Curricula in the New Jersey Secondary Public Schools,
Joyce E. A. Versteegh-Limberg. 22 Dec 78, 59p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210, PC$3.50, MF$0.83 Plus Postage.

This 1978 survey of 408 New Jersey secondary public schools found that 242 of them use a computer for instructional purposes. Primarily the computer is used in teaching students to write programs and as a computational aid to problem solving, with mathematics departments making the greatest use of these applications. The survey results justify the practice of those colleges already offering computer science courses for undergraduate and graduate mathematics education majors. It is recommended that mathematics education curricula and inservice programs be modified to include other computer related courses in addition to computer science courses. A bibliography and copies of the questionnaires used together with cover letters and instructions are included.

ED-167 184 Not available NTIS
Waterloo Univ. (Ontario).
Computerized Multi-Media Instructional Television,
Gordon C. Andrews, and Christopher K. Knapper. 6 Apr 78, 119p
Proceedings of a Symposium on COMIT, Waterloo (Ontario) on April 6, 1978. For related documents see IR-007 186-193 and IR-007 285.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210, PC$6.01, MF$0.83 Plus Postage.

A joint research project in educational techniques, which was conducted by the University of Waterloo and the IBM Corporation, explored the use of color television with random-access videotape under computer control. At the end of the three-year project, papers were solicited from all COMIT (Computerized Multi-Media Instructional Television) participants, and 12 of the 15 professors who had authored courses submitted papers. A representative sample of seven papers was presented at a one-day COMIT Symposium, some accompanied by videotaped demonstrations that illustrated the teaching techniques used. In order to provide as complete a record of the project as possible, all 12 of the papers from participants are included in this volume (grouped, where possible, by subject), as well as comments by the project director and the coordinator from IBM and a summary of the pedagogical lessons learned from COMIT. Courses described include environmental engineering, survey design, advanced calculus, organic synthesis, biology, human movement, ice hockey practice, football, leisure experience, history of art, and English. The appendix contains the schedule for the COMIT Symposium with the names of the speakers.

HRP-0026816/9 Not Available NTIS
Role of the Clinical Specialist as Change Agent -- An Experiment in Preoperative Teaching.
Shirley Girouard. 1978, 9p
Pub. in International Jnl. of Nursing Studies v15 n2 p57-65 1978.

The effectiveness of the clinical specialist using the linker model for planned change in preoperative training by nurses is assessed in this study. A literature review establishes the need for more counseling of patients and the advantages of preoperative training for rapid recovery. The survey sample includes 36 nurses and 80 patients in two general hospital medical-surgical units, with one unit serving as a control group. The data derive from kardex and chart review, and from interviews with patients. Actual intervention includes a formal class and discussion to fill knowledge gaps; written resources, especially journal articles; a demonstration of patient teaching by the clinical specialist; and development and implementation of a preoperative teaching plan for the kardex. The results indicate that nurses in the experimental group do not have more positive opinions than previously about preoperative teaching and do not claim to do more preoperative teaching, but that they make more kardex notes about preoperative teaching than the control group. The findings also indicate that the amount of preoperative teaching increases significantly after intervention. It is concluded that, based on some improvement in teaching performance, the model is appropriate for the clinical specialist as a change agent. Seven tables are supplied.

HRP-0027735/0 Not Available NTIS
Connecticut Univ., Storrs. School of Nursing.
Regrouping for an Integrated Curriculum.
Jane E. Murdock. 1978, 6p
Pub. in Nursing Outlook v26 n8 p514-519 Aug 78.

Clinical experiences embodied in a 2-year integrated curriculum at the University of Connecticut School of Nursing are reported. Two conceptual frameworks are the basis of the curriculum, one serving as a basis for the general education component and the other providing a framework for the nursing major. Theory courses run along an illness-wellness continuum and focus in sequence on developmental, situational, and combined developmental-situational hazardous events. There is also a sequential emphasis on precrisis, crisis, and crisis resolution stages. Process courses encompass all laboratory activities and are organized around each step in the nursing process. In implementing the curriculum design, faculty preference for assignment to clinical junior-level and senior-level teams was ascertained through individual questionnaires and interviews. Essential concepts from traditional specialties had to be translated into the crisis theory framework, and it was necessary to teach in unfamiliar content areas and develop physical assessment skills. Team-level decisionmaking guided the curriculum implementation process, particularly with respect to the resolution of interpersonal issues. The curriculum design prescribed a generalist rather than a specialist role for faculty members in meeting clinical objectives associated with crisis theory and the nursing process. The evidence indicates that students benefit from the sustained faculty relationship of the generalist approach.

HRP-0027739/2 Not Available NTIS
Iowa Univ., Iowa City. Coll. of Nursing.
Nursing Electives in a Baccalaureate Program.
Patricia M. Ostmoe, Sandra Rae Powell, Laura Martinsek Roskoski, and Carol Ann Watson. 1978, 5p
Pub. in Nursing Outlook v26 n8 p508-512 Aug 78.

The effect of including nursing electives in the undergraduate program at the University of Iowa College of Nursing is assessed. Faculty members designed a process curriculum comprised of six core courses. Electives were viewed as one way to provide flexibility. They were included in the curriculum to provide an opportunity for students to increase their comprehension, depth, and scope in selected areas. Philosophical concerns in curriculum implementation are discussed. A forum involving faculty and students was held and questionnaires were administered to both groups to clear up many philosophical and educational concerns associated with implementing electives. Implementation of the integrated curriculum, with electives, significantly changed the number of students enrolling in courses in the undergraduate program. An increased number of students were able to progress at varying rates. A preregistration system was instituted to deal with the issue of how many students would want electives and how many electives should be offered. The overall reaction was positive. The nursing electives in the baccalaureate curriculum included: gerontological; surgical; psychiatric; family, intrapartum and neonatal; and public health nursing.

HRP-0029988/3 Not Available NTIS
Brigham Young Univ., Provo, UT.
Innovative Program Keeps Them 'Down on the Farm'.
Ralph B. Smith. 16 Mar 79, 3p
Pub. in Hospitals, Jnl. of the American Hospital Association v53 n6 p131-132, 134 16 Mar 79.

A 4-year State college in Utah extended its nursing program to a rural hospital in an effort to implement the nursing advancement program (NAP) designed by Westminster College in Salt Lake City. In selecting students for the NAP, priority consideration was given to permanent residents of the community. Admission to the NAP was open to persons who were employees of the rural hospital, local nursing homes, and another rural hospital approximately 40 miles away, and to qualified members of the community. Applicants included licensed practical nurses, nursing aides, and other qualified individuals. Thirty-two prospective candidates were scheduled for interviewing and testing; 7 were finally selected for participation. The first year of the program terminated in August 1976, and students took the National League for Nursing Achievement Test in Practical Nursing. Mean percentile scores in such areas of patient care as medical-surgical, pharmacology, nutrition and diet, basic nursing, maternal and child health, and body structure, ranged from 69 to 90. Four students took and passed the Utah State Board Test Pool Examination for Licensed Practical Nursing. After the second year of the program, 11 students received an associate degree in nursing. These students passed the State Board Test Pool Examination for Registered Nursing. The results demonstrated that an innovative registered nursing program can be successfully carried out in rural hospitals. Supporting data are tabulated.

HRP-0030003/8 Not Available NTIS
Salem Hospital, MA.
Regional Cardiac Care Program -- Planning and Development.
Emily L. Feener. Mar 79, 5p
Pub. in the Jnl. of Nursing Administration v9 n3 p27-31 Mar 79.

Five Massachusetts hospitals cooperated to provide a cardiac care educational program for staff

nurses. It was determined that a successful cardiac care program should provide knowledge and skills in such areas as the concept of cardiac care units, the expanded role of specialty area nurses, knowledge of cardiorespiratory anatomy and physiology, specific cardiac conditions, basic life support, electrocardiogram monitoring, cardiac arrhythmias, biomedical principles related to electrical hazards and safety, patient and family education, and psychosocial aspects of cardiac care. In the regional approach to educational program development, three major steps were taken: (1) formation of a curriculum committee; (2) identification of course instructor qualifications; and (3) letters sent to involved and interested parties. Directors of nursing at the five hospitals have full control over the number of nurses enrolled in the program. This facilitates hospital staffing and allows a random mix of participants with varying degrees of experience, from all shifts, and from various types of cardiac care units. There are six prerequisites for participation: professional nurse licensure in Massachusetts; a minimum of 1 year of medical-surgical experience when possible; position or intended position in an intensive care, cardiac care, telemetry, emergency, or other unit where nurses have responsibility for monitoring cardiac patients; liability insurance; certification by the American Heart Association in basic life support; and employment by a participating hospital. Problems in and benefits of the program are discussed.

HRP-0030110/1 PC **A13**/MF **A01**
California Univ., San Francisco. Office of Medical Education.
Resident Training for Primary Care -- A Study of Nine Residency Programs.
Edwin F. Rosinski, and Fred Dagenais. 1978, 288p

Nine residency training programs for primary care physicians were studied with regard to objectives, clinical affiliations, staffing, residents' characteristics, patients, and funding sources. The programs are located in the Boston City Hospital, the University of California at Los Angeles, the University of California at San Francisco, Dartmouth Medical School (N.H.), the University of Florida, Harvard University (Mass.), the University of Missouri at Kansas City, the University of Rochester (N.Y.), and George Washington University (D.C.). Questionnaires were administered to obtain data on residents, staff, educational experiences, patient care services, clinical affiliations, program directors, the attitudes of health professionals toward residents in primary care, plans for institutionalization of residency programs, funding, and academic achievement. Site visits to all nine programs were made. The problems most commonly faced were funding, obtaining faculty, negative perceptions of primary care, colleagues' hostility, adequate patient loads, obtaining space, and obtaining residents. Clinical affiliations used to train primary care residents included urban university, community, children's, and chronic disease and rehabilitation hospitals, family practice units, neighborhood health centers, rural health centers, university-operated and affiliated health maintenance organizations, group practices, and solo practitioners. Arrangements for operating and administering programs tended to be made by departments of medicine. The appendixes contain additional information on the study and forms. Supporting data and references are included.

HRP-0900617/2 PC **A14**/MF **A01**
California State Coll., Sonoma, Rohnert Park.
Demonstration Study of a Second Step Nursing Program.
Final rept.
1978, 303p
Grant DHEW-5-D10-NU-01568-03

The methodology and findings of a longitudinal study of Second Step, an innovative program for registered nurses (RN's) initiated at California State College, Sonoma, are described. The program is unique in that it admits only RN's who have earned an Associate in Arts degree or its equivalent and who hold current California licenses. The curriculum, which builds upon previous education in nursing, applied sciences, and liberal education, stresses community health and a broad knowledge of the health-illness continuum, problemsolving, decisionmaking, and progress toward self-actualization. The study focused on generation of a theoretical explanation concerned with the processes and characteristics of the students and the program vis-a-vis the participants' academic success while enrolled in the program, and their achievements in professional nursing after graduation. Among the specific tasks of the project were the investigation of the personal characteristics of successful nursing students, assessment of the teaching behaviors of nursing faculty, exploration of factors of the curriculum and setting from the viewpoints of students and faculty, and formulation of a model of the educational processes associated with the program. It is anticipated that the study will contribute to the body of knowledge about the education and professionalization of students in general. Tables, data-collection instruments, and related study material are appended.

HRP-0901289/9 PC **A09**/MF **A01**
Bureau of Health Manpower, Hyattsville, MD.
State Programs Supporting Health Manpower Training -- An Inventory. Volume 2, Methodology.
1978, 189p DHEW/PUB/HRA-78/35
See also Volume 1, HRP-0029650.

This publication describes the methodology used during a study of the level of State support for the training of health manpower and presents some highlights from the final report. The study provides information on State expenditures for health training programs in 50 States; only 32 States, however, underwent intensive review following development of the methodology. Two phases were involved in the development of the inventory: (1) the conduct of a feasibility study intended to explore problems and issues associated with the development of an inventory and to design standardized procedures for data collection on a national basis; and (2) implementation of techniques and procedures developed in the first phase for compilation of government financial support in four categories (institutional support, capital outlay, student aid, and direct support). The discussion covers the major data sources, the types of data available, and the problems associated with their collection. Also included are discussions of a recommended data collection methodology for updating or replication purposes and of site visits made during the course of the study, as well as maps and tables.

HRP-0901696/5 PC **A04**/MF **A01**
New York State Dept. of Health, Albany. Veterans Health Manpower Center.
Recruitment, Counseling and Referral Services for Vietnam-Era Veterans Seeking Health Career Employment and/or Educational Opportunities.
Final rept.,
John E. Bailey, and Charles J. Stefka. 1979, 57p
Contract PHS-HRA-231-77-0006

Program activities related to health career counseling, job referral, and job placement services for Vietnam veterans with military-medical training are described. The review covers the State Health Department's Operation MEDIHC, a health manpower recruitment program for veterans between 1970 and 1978. Issues addressed include: (1) identification and enrollment of military-medically trained Vietnam era veterans; (2) counseling and placement; (3) followup of health-related placements; (4) visits to major military bases in New York; (5) civilians' acceptance of military allied health education and experience; and (6) maintenance of a continuing public information program. Recruitment and placement techniques have been essentially the same throughout the course of the program. From 1970 through 1978, 6,797 veterans enrolled for counseling and placement services. It was not possible to sustain contact with 1,470 of the veterans, and work was carried out with a core group of 5,327 who were very successful in job placement. In New York over 80 percent of all veterans were successful in attaining employment and/or educational goals. Recommendations for improved use of military personnel in allied health professions are offered. A detailed summary of MEDIHC activities and accomplishments from 1972 to 1978 is presented. Data and illustrations relevant to the program are appended.

ORAU-145 PC **A06**/MF **A01**
Oak Ridge Associated Universities, Inc., TN.
Impact of Adjustment Mechanisms on Workers Undergoing Technological Change.
L. M. Blair, R. Alford, and G. de Mik. Sep 78, 121p
Contract EY-76-C-05-0033

This study includes a conceptual framework, a worker-adjustment model, a set of survey questionnaires, and techniques for analyzing the data collected. In addition, a pilot study is included. The research focuses on the impact of adjustment mechanisms on worker job performance and job satisfaction during periods of technological change. Adjustment mechanisms encompass a broad spectrum of activities such as information programs, job guarantees, income and finge-benefit packages, reemployment aids, and worker participation in the changeover process. The adjustment model used as the theoretical framework for the empirical investigation was developed by combining and augmenting worker adjustment concepts from industrial psychology and related concepts from economics. A basic assumption in the model is that technological change alters, or threatens to alter, the level of materialistic and psychological element available to the worker from his job. The amount of adjustment that a worker makes with the introduction of new technology is related to the intensity of the impact of the new technology, availability and use of adjustment mechanisms, the industry and occupations involved, external factors (i.e., the region and employment opportunities available), and factors associated with the individual (i.e., biographical elements and work experience). (ERA citation 04:019338)

PB80-105356 PC **A04**/MF **A01**
Washington State Council for Postsecondary Education, Olympia.
Tuition and Fees Policy Recommendations (Washington).
Nov 78, 61p

The tuition and fee policy recommendations from a special committee for postsecondary education in the state of Washington are detailed. Actual tuition and fee calculations for 1979-81 are listed.

PB80-106016 PC **A03**/MF **A01**
Maine Dept. of Educational and Cultural Services, Augusta. Div. of Management Information.
Maine Educational Facts.
1978, 32p

The report contains educational statistics on elementary and secondary schools in Maine. The data concentrates mostly on enrollment rates for public and private schools.

PB80-109473 PC **A10**/MF **A01**
Indiana Univ. at Bloomington. Midwest Center for Public Sector Labor Relations.
Labor Relations in Local Government: Unfair Labor Practices, Collective Bargaining, Factfinding and Grievances.
Leader's guide,
1977, 211p HUD-0000298

Labor Relations in Local Government is a training program for elected or appointed urban managers. Managers are assumed to have had little or no formal training in labor relations and only minimal experience in the area. The program provides managers with the knowledge and skills needed to operate effectively and efficiently in public sector labor relations and consists of the following four modules: (1) unfair labor practices, which identifies employer and union violations of labor laws and helps the urban manager avoid unfair labor practices; (2) collective bargaining, which develops ability to represent management at the bargaining table while working with labor to obtain favorable outcomes for all parties; (3) factfinding, which specifies procedures and criteria for preparing an effective and convincing presentation of management's position before a factfinder; and (4) grievances, which deals with the support of management's working relationship with a union in administering a contract, while still fulfilling public service responsibilities. Each module is presented in a separate workshop, and the workshop leader should have experience in conducting meetings or training or education sessions. A participant reference manual giving information on the workshop

subject and a workshop leader guide providing detailed instruction for conducting each workshop are included for each module. Self - administered quizzes and role playing scripts are also provided. Each workshop emphasizes student discussion and participation.

PB80-109481 PC **A21**/MF **A01**
Connecticut Univ., Storrs. Inst. of Public Service.
Long River Region Simulation. A Learning Package About Interjurisdictional Policy Management for Elected, Appointed, and Citizen Officials and Classroom Students.
Vinton D. Fisher, James F. Wolf, Myron E. Weiner, Joan Buck, and Thomas Phillips. 1977, 500p HUD-0000302

The Long River Region Simulation learning package is one of two prepared under HUD sponsorship by the University of Connecticut's Institute of Public Service for the National Training and Development Service. It is a leaders' and participants' manual designed for elected, appointed, career, and citizen policymakers and for classroom students wanting to solve policy management problems existing in an interjurisdictional setting. Relying heavily on learning theory, simulation allows participants to practice managing problems similar to those found on the job, but without the risks of interfering in an interjurisdictional system. Simulation contains four elements: a data base describing Long River, roles within jurisdictions, events and tasks, and skill exercises. Long River is a synthetic construction of a metropolitan area, population 700,000, with a governmental structure consisting of 12 municipalities, 2 county units, and 18 special districts. Participants are asked to play three simultaneous roles and carry out the responsibilities implied within each role. The roles include that of a community official (mayor, community leader, or city manager), that of a community representative to the Long River Region jurisdictional team, and that of a regional policy task force member dealing with a particular regional problem. The purposes of simulation are, among other things, to recast perceptions and increase understanding about interjurisdictional relations, to expand knowledge about the special character and dynamics of interjurisdictional issues, and to develop skills in policy management. Package components describe how to conduct the Long River Region Simulation in eight sessions, how to use and modify the Long River Region data base, and how to evaluate the simulation for practitioners and classroom students. Appendices contain a bibliography, a description of typical county and municipal organization structures found in the simulation, cumulative and national average tables, data base sources, and maps of the region.

PB80-801483 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Allied Health Personnel: Manpower Supply, Needs, and Demand. Volume 1. 1964-September, 1978 (A Bibliography with Abstracts).
Rept. for 1964-Sep 78,
Elizabeth A. Harrison. Dec 79, 228p

The bibliography reviews literature on specially trained and licensed health manpower who support, complement, or supplement the professional functions of physicians, dentists, registered nurses, and other health professionals in the delivery of health care. Also included are those personnel who assist environmental engineers and other personnel in environmental health control and preventive medicine activities. Research reports discuss the employment, utilization, and role of allied personnel in health care delivery. Manpower resources, distribution, and projected needs are delineated. Implications for health manpower planning are discussed. (This updated bibliography contains 220 abstracts, none of which are new entries to the previous edition.)

PB80-801491 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Allied Health Personnel: Manpower Supply, Needs, and Demand. Volume 2. October, 1978-November, 1979 (A Bibliography with Abstracts).
Rept. for Oct 78-Nov 79,
Elizabeth A. Harrison. Dec 79, 47p
Supersedes NTIS/PS-78/1065 and NTIS/PS-77/0965. See also Volume 1, 1964-September, 1978, PB80-801483.

The bibliography reviews literature on specially trained and licensed health manpower who support, complement, or supplement the professional functions of physicians, dentists, registered nurses, and other health professionals in the delivery of health care. Also included are those personnel who assist environmental engineers and other personnel in environmental health control and preventive medicine activities. Research reports discuss the employment, utilization, and role of allied personnel in health care delivery. Manpower resources, distribution, and projected needs are delineated. Implications for health manpower planning are discussed. (This updated bibliography contains 38 abstracts, all of which are new entries to the previous edition.)

PB80-802762 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Dental Personnel: Manpower Supply, Needs, and Demand (A Bibliography with Abstracts).
Rept. for 1964-Nov 79,
Elizabeth A. Harrison. Dec 79, 109p
Supersedes NTIS/PS-78/1081 and NTIS/PS-77/0959.

References are cited on dental manpower relevant to the following topics: Dentists scarcity areas, recommendations for alleviating these shortages, determinants of current and projected needs, population characteristics as an indicator of demands for services, and dental productivity and organization of dental services. (This updated bibliography contains 105 abstracts, 9 of which are new entries to the previous edition.)

SHR-0002957 PC **A12**/MF **A01**
Sangamon State Univ., Springfield, IL. Center for Policy Studies and Program Evaluation.
Analysis and Interpretation of Training Needs Data from Illinois CETA - Related Agencies.
John N. Collins, Barbara E. Ferrara, and Merrill D. Redemer. Aug 78, 251p

In order to assess staff training needs for Illinois Comprehensive Employment and Training Act (CETA) agencies, researchers collected interview and questionnaire data from CETA Prime Sponsor and Balance of State Program Agent offices. Respondents included 44 directors and other top management staff, 144 supervisors, and 470 nonsupervisors. The data dealt with self - assessment and supervisor and director assessment of training needs, problems and obstacles encountered in performing work, actual work activities and requisite job skills, and analysis of organizational climate problems within the offices. Data were rank ordered to indicate relative importance of the various items, and then types of training needs consistently appearing in the series of responses were flagged as priorities within their categories. Results show that some of the top priority needs of supervisors fall into these areas: understanding CETA regulations, using counseling techniques, and analyzing labor needs. Some top priority needs for nonsupervisors fall into these areas: appraising and testing clients for guidance purposes, coping with changes in goals and requirements, and communicating effectively in writing. Directing the work of others, fostering effective relations among office staff, and identifying and analyzing problems are training areas flagged as top priority for directors. Additional top priority, important, and relatively unimportant needs for the three groups are presented. Elaborated codes for job and work obstacles are appended. The survey instrument, support data, and tables are provided.

5J. Psychology (Individual and Group Behavior)

AD-A075 622/1 Not available NTIS
Naval Submarine Medical Research Lab Groton CT
Attitude Changes during and after Long Submarine Missions,
B. B. Weybrew , and H. B. Molish. Mar 77, 15p
Rept no. NSMRL-825
Availability: Pub. in Undersea Biomedical Research, Submarine Supplement, pS175-S189 1979 (No copies furnished by DTIC).

No abstract available.

AD-A075 652/8 PC **A11**/MF **A01**
Army Training Developments Inst Fort Monroe VA
The Effect of Different Question Types on Retention in Audiovisual Materials.
Robert R. Begland. 16 Jul 79, 235p

This study tested whether postadjunctive questions facilitate learning in selected audiovisual materials and whether the type of question affects retention. The study was conducted in two phases. Phase I was designed to collect empirical data on the extent of question usage in audiovisual lessons purchased by the U.S. Army. From the review of 218 lessons, there were obvious differences in the design strategy of each lesson producer as measured by the presence of review questions, preadjunctive and postadjunctive questions, practice exercises and self-evaluation items. Phase II was designed to measure changes on a posttest attributable to the insertion of different types of post-adjunctive questions inserted into an audiovisual lesson in an 8 mm filmstrip. The sample consisted of 345 soldiers attending Advanced Individual Training (AIT) at Ft. Benning, Georgia. The subjects were randomly assigned to one of four treatment groups.

AD-A075 694/0 PC **A03**/MF **A01**
Stanford Univ Calif Dept of Psychology
On Resisting Social Influence.
Technical rept.,
Susan Andersen , and Philip Zimbardo. Sep 79, 33p Rept no. TR-Z-79-01
Contract N00014-78-C-0425

Resisting social influences becomes important when such influences can be appropriately thought of as 'mind control.' When information is systematically hidden, withheld or distorted it is impossible to make unbiased decisions. Under these circumstances, people may be subtly led to believe they are 'freely' choosing to act. It is precisely this kind of decision that persists and most affects our behavior since we come to believe in those attitudes and actions for which we have generated our own justifications. The thesis of this essay is that 'mind control' exists not in exotic gimmicks, but rather in the most mundane aspects of experience. Because it does, it is possible to reduce our susceptibility to unwanted coercive control by increasing our vigilance and learning to utilize certain basic strategies of analysis. In this paper, we present resistance strategies which are broadly applicable to the wide array of mind-manipulation attempts that surround us daily--in a 'self-help' format that provides for ready accessibility. Findings from relevant social-psychological research, from interviews and personal experiences with con men, cultists, super-salesmen and other perpetrators of mind control comprise the reservoir of information from which we have drawn.

AD-A075 695/7 PC **A03**/MF **A01**
Stanford Univ Calif Dept of Psychology
Modifying Shyness-Related Social Behavior through Symptom Misattribution.
Technical rept.,
Susan E. Brodt , and Philip G. Zimbardo. Sep 79, 39p Rept no. TR-Z-79-02
Contract N00014-78-C-0425

An experimental misattribution paradigm proved to be a powerful intervention treatment for altering social participation among dispositionally shy women. When the arousal symptoms they usually associated with social anxiety were misattributed to a non psychological source, high frequency noise, these extremely shy women behaved as if they were not shy. Their verbal fluency and interactional assertiveness resembled that of not-shy comparison women, while differing significantly from shy cohorts. In addition, their physiological arousal, measured as change in heart rate over the course of the interaction, declined. The general modification of their demeanor was also reflected in a stronger tendency to prefer social affiliation than was shown by those in the shy and not-shy comparison groups. Finally, the majority were misjudged by their male partner as not being shy. Of

further interest is the placebo effect discovered among the not-shy women also given this same misattribution manipulation: they became physiologically aroused, interpreted it as negative affect and did not prefer to affiliate with their partner. The conceptual and pragmatic implications of this cognitive intervention strategy are discussed. (Author)

AD-A075 707/0 PC **A07**/MF **A01**
Army Research Inst for the Behavioral and Social Sciences Alexandria VA
Development of a Measure of Army Leadership Climate: The Military Leadership Behavior Survey.
Ronald G. Downey. Dec 74, 131p Rept no. ARI-RES PROBLEM REV-74-5

A questionnaire used by the CONARC Leadership Board study in 1971 was modified and expanded, in order to better define and measure specific aspects of leadership and to check the reliability of the resulting scores and their relation to other measures. The modified 77-item questionnaire was mailed to Army officers and enlisted personnel; and 1,751 tests were analyzed. From these analyses the Military Leadership Behavior Survey (MLBS) was developed in which a superior, self, or subordinate view is asked, for each of 53 questions about specific actions, on what the leader DOES and what the leader SHOULD do. The answers delineate four primary leadership dimensions, Task Professionalism, Task-Oriented Consideration, Person-Oriented Consideration, and Personal/Interpersonal Professionalism. The Military Leadership Behavior Survey reflects a subjective view of the leader's behavior which correlates with his actual behavior and which may greatly influence the actions of unit personnel and can be dealt with most effectively by educational programs. The four leadership dimensions identified by the MLBS appear to be reliable and consistent, and correlate well with the dimensions of leadership indentified in earlier industrial and military research.

AD-A075 721/1 PC **A09**/MF **A01**
Bendix Corp Ann Arbor MI Dept of Applied Science and Technology
Research on SocialPsychological Factors Underlying the Idea of Discipline. Volume I. Conceptual and Predictive Models of Army Unit Discipline.
Final rept. 14 May 73-13 May 74,
Ronald G. Bauer , and Robert L. Stout. May 74, 193p
Contract DAHC19-73-C-0036

The purpose of the research was to develop and test conceptual and predictive models of Army unit discipline. In addition, the research was designed to develop measures of discipline that may be used as diagnostic tools to help Army leaders empirically assess and manage discipline in their commands. The results indicate that there are three distinguishable components of military unit discipline; unit performance, appearance, and conduct. Demonstrably reliable scales and indices are developed to measure these discipline criteria and their predictor variables. Regression analyses indicate Army unit discipline, and especially performance, are highly predictable using unit members' perceptions of various environmental phenomena, including leadership behavior, esprit d'corps, military work role, racial discrimination, availability of recreational facilities, and quality of living quarters. The results suggest that the measures developed and tested in this inquiry may be used as diagnostic tools to help Army leaders assess and improve discipline in their commands. The implications of these findings for public policy and future research needs are discussed. (Author)

AD-A075 727/8 PC **A06**/MF **A01**
Illinois Univ At Urbana-Champaign Dept of Psychology
Fitting a Multidimensional Component Model to Binary Data.
Technical rept.,
Raymond Frederick Koopman, Jr. Oct 68, 108p
Contracts N0nr-1834(39), N00014-67-A-0305-0003

A solution to factoring binary data matrices is proposed by weakening the symmetric-least-squares error function of component analysis to requiring only monotonicity over individuals between item responses and reproduction from the analysis. Two classes of measures of monotonicity are considered; one analogous to regression of the observations on the model (class I) and the other analogous to regression of the model on the observations (class II). Several computing procedures were tried: a gradient-oriented procedure which led to local minima and a refactoring procedure which led to general minima for class II functions but not for class I functions. Solutions for the class II functions indicated existence of undesirable degenerate results. Suggestions are made for further modified computing procedures for class I functions. (Author)

AD-A075 740/1 PC **A03**/MF **A01**
Army Research Inst for the Behavioral and Social Sciences Alexandria Va
Observer Self-Location Ability and its Relationship to Cognitive Orientation Skills.
Technical rept.,
John R. Milligan , and Raymond O. Waldkoetter. Sep 79, 35p Rept no. ARI-TR-388

This report presents research on the ability of observers to locate military targets and to relate that location to their own position by use of military maps. The experimenters used a one-way analysis of variance design in which 30 observers were divided into categories of either high or low self-location abilities (median split) on a previously administered practical exercise in which the observers were required to locate their geographical position in relation to their position on a military map. Results revealed statistically significant overall differences between the two groups of observers on all three tasks. Those subjets who scored high on the previous self-location exercise also scored high on the three experimental tasks. The experimenters conclude that the pointing instrument and visual imagery tasks were successful in distinguishing subjects who scored well and those who scored low on previous self-location exercises. The experimenters also suggested that the simple pointing instrument and visual imagery tasks may, with further testing, be shown to be effective and low-cost tests to predict which observers will need additional training in self-location skills to training in observer skills.

AD-A075 815/1 PC **A04**/MF **A01**
Johns Hopkins Univ Baltimore Md Dept of Psychology
Cooperative Problem Solving by Like- and Mixed-Sex Teams in a Teletypewriter Mode with Unlimited, Self-limited, Introduced and Anonymous Conditions.
Technical rept.,
Paul Roller Michaelis. Aug 79, 64p Rept no. TR-9
Contract N00014-75-C-0131

It is well documented that men and women differ significantly in several important psychological respects. The pattern of these differences suggests the possibility that when a natural language problem-solving computer is built, it might have to adjust its language and problem-solving strategy to match that of the sex of its user. That possibility was examined in the experiment reported here. Performance was assessed on four classes of dependent measure: (1) the time required to assemble the model, (2) various measures of verbal productivity, (3) experimenter tabulations of various types of subject-to-subject information requests, and (4) responses to a questionnaire completed by the subjects at the conclusion of their session. There were several highly significant differences between the teams who were unlimited and those who were required to limit their word usage. The most interesting of these is that the limited teams assembled the model more quickly than did the unlimited teams. There were, however, no significant differences attributable to the interaction of this word usage factor with any other variable.

AD-A075 946/4 PC **A03**/MF **A01**
National Aviation Facilities Experimental Center Atlantic City Nj
Modeling Pilot Response Delays to Beacon Collision Avoidance System Commands.
Final rept. Jul-Sep 77,
B. Billmann , T. Morgan , and J. Windle. Oct 79, 35p FAA-NA-79-19, FAA/RD-79/74

This report contains the results of an analysis of pilot response delays to collision avoidance commands displayed in the cockpit of a General Aviation Trainer (GAT) simulator. Data were obtained from previous tests conducted in the Beacon Collison Avoidance/GAT simulation at the National Aviation Facilities Experimental Center (NAFEC), Atlantic City, New Jersey. Subjects were general aviation pilots with a wide range of experience. Statistical curve fitting techniques are applied to response delay data. For fixed geometries, velocities, and aircraft response rates, the separation at the point of closest approach between aircraft responding to collision avoidance system (CAS) commands is inversely related to the length of pilot delay in responding to the CAS command. In experimental simulations used to measure that collision avoidance system effectiveness, the modeling of pilot response delays should be as realistic as is practicable. The results of this study provide a more realistic model than previously available. The Gamma distribution was the best distribution applicable to the queuing processes which are conceptually similar to the process that is generating the pilot response delay times. In terms of minimum error mean square, lack of bias, and uniformity of fit, the use of the Gamma distribution was found to be superior in approximating the empirical data. The recommendation to use the Gamma distribution in modeling pilot response delays in subsequent experimentation at NAFEC is made. (Author)

AD-A075 972/0 PC **A11**/MF **A01**
Stanford Univ Calif School of Education
Spatial Ability: A Review and Reanalysis of the Correlational Literature.
Technical rept.,
David F. Lohman. Oct 79, 226p Rept no. TR-8
Contract N00014-75-C-0882
Report on Aptitude Research Project.

The first and longest part of this report reviews and reanalyzes the major American factor analytic studies of spatial ability in terms of a hierarchical model of ability organization. The most important questions are 'What are the major dimensions of individual differences in spatial ability.' and 'What are the implications of this research for a process understanding of spatial ability.' The second section examines the effects of alternative solution strategies used by subjects on spatial tests. Some of the major confusions in the factor analytic studies are shown to result from individuals solving spatial problems in different ways. In addition to reviewing the literature on this topic, some new data are presented and discussed. The third section reviews the relationship between speed, level, and complexity in test performance. The speed-level dimension is shown to be crucially important for all factor analytic work, particularly for the distinction between broad, general factors and narrow specifics. Implications of this research for chronometric studies of spatial ability are also discussed. It is argued that individual differences in speed may be largely independent of individual differences in level, especially on spatial tasks.

AD-A075 973/8 PC **A08**/MF **A01**
Stanford Univ Calif School of Education
Spatial Ability: Individual Differences in Speed and Level.
Technical rept.,
David F. Lohman. Oct 79, 153p Rept no. TR-9
Contract N00014-75-C-0882
Report on Aptitude Research Project.

This experiment investigated the relationships between speed, level, and complexity in individual differences in spatial ability. Thirty male high school and college students representing a wide range of individual differences in verbal ability and spatial ability were required to match, rotate, combine, and combine and then rotate three to eight point polygons. Three levels of construction (one, two, or three stimuli), three levels of stimulus complexity (low, medium or high), three levels of rotation (0, 90, or 180 degrees), and two types of discriminative response (correct or incorrect) were fully crossed in the within subjects design. Additionally, type of addition (left or right) and complexity of the to-be-constructed stimulus (low or high) were nested within levels of the construction facet but crossed with each other and all other facets. Correctness, confidence, total time, and from two to four component times were obtained on each

item. Data were analyzed using regression, analysis of variance, and correlational techniques. It was concluded that the results of the experiment supported the hypothesis of speed-level independence and provided important insights into the nature of spatial ability.

AD-A076 020/7 PC **A02**/MF **A01**
Tufts Coll Medford Mass Inst for Applied Experimental Psychology
Research Involving Communication Processes in Task Oriented Groups.
Technical rept.,
Thornton B. Roby. 15 Nov 60, 7p Rept no. TR-3
Contract Nonr-494(15)

This research is concerned with the identification and investigation of the component processes in group information acquisition and use.

AD-A076 045/4 PC **A02**/MF **A01**
Antioch Coll Yellow Springs Oh
Tracking Performance on Combined Compensatory and Pursuit Tasks.
Technical rept.,
Marianne Cruzen , and John W. Senders. Feb 52, 20p WADC-TR-52-39
Contract W33-038-ac-19816

A comparison has been made between compensatory and pursuit tracking for a one dimensional visual tracking task, and the functional relationship between tracking accuracy and the nature of the tracking task has been determined for various combinations of pursuit and compensatory tracking. The results indicate that important, as well as statistically significant, differences exist between compensatory and pursuit tracking, and that accuracy of tracking increases markedly as a function of the amount of pursuit component which exists in the task. However, a tracking task which has a pursuit component of 50 per cent or greater is not significantly different, in terms of time-on-target score, from a 100 per cent pursuit task. (Author)

AD-A076 057/9 PC **A03**/MF **A01**
Northwestern Univ Evanston Il
Transfer of Training in Motor Learning as a Function of Degree of First-Task Learning and Inter-Task Similarity.
Technical rept.,
Carl P. Duncan, and Benton J. Underwood. Apr 52, 45p WADC-TR-52-64
Contract AF 33(038)-11396

Transfer between a first and a second task, both available on the same piece of equipment, was studied as a function of degree of learning of the first task and of degree of similarity between tasks. It was found that acquisition of the second task was facilitated by practice on the first task, and that the facilitation increased directly with degree of first-task learning. Positive transfer also occurred with all degrees of inter-task similarity, and increased directly as similarity increased. Differential positive transfer resulting from variation of first-task learning lasted throughout all 60 acquisition trials on the second task; inter-task similarity produced differential positive transfer during only the first 30 trials. Some forgetting of the second task was present after a 24-hour rest; the forgetting neither varied as a function of the two main variables nor was attributable to their presence.

AD-A076 165/0 MF **A01**
State Univ of New York At Buffalo
Reliability of the Attitudes TOWARD Women Scale (AWS) and the Personal Attributes Questionnaire (PAQ).
Research note,
Jan D. Yoder , Robert W. Rice , Jerome Adams , Robert F. Priest , and Howard T. Prince, II. Dec 79, 19p ARI-RN-79-20
Grant DAHC19-77-G-0008
Availability: Microfiche copies only.

The stability and internal consistency of Spence and Helmreich's sex-role scales, the Attitudes toward Women Scale (AWS) and Personal Attributes Questionnaire (PAQ), are reported. An entire first-year class of 1,007 male and 78 female cadets at the U.S. Military Academy were given a battery of psychological tests before and after cadet basic training a 2 1/2-month period. The AWS and PAQ proved to be highly reliable, comparable to other frequently used psychological tests. This psychometric information encourages researchers to make further use of these sex-role scales. (Author)

AD-A076 178/3 PC **A02**/MF **A01**
Army Behavior and Systems Research Lab Arlington Va
Attitudes of Experienced Helicopter Pilots to Nap-of-the-Earth Flight.
Research problem review,
David Meister, Sr. Jul 72, 11p Rept no. BESRL-RPR-72-1

The work unit of the Behavior and Systems Research Laboratory (BESRL) was recently asked to investigate reports that nap-of-the-earth (NOE) daytime flight was excessively fatiguing and stressful. Since fatigue and stress are largely subjective experiences, the logical initial approach was to ask helicopter pilots flying NOE how they felt about the matter. Twenty-two pilots from the 1st Squadron, 9th Cavalry, based at Ft. Hood, were each interviewed for 45 minutes during the period June 7 - 9, 1972. Twenty of the pilots were Vietnam veterans with an average total number of 1377 helicopter hours, 1025 of these flown in Vietnam. The two (2) non-Vietnam pilots had an average of 240 flight hours.

AD-A076 201/3 PC **A07**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB Oh School of Engineering
Expectancy Theory and Policy Capturing: A Predictive Model of Student Effort in an Academic Environment.
Master's thesis,
Merl A. Morehouse. Sep 79, 136p Rept no. AFIT/GSM/SM/79S-11

This thesis examined the valence and force models as hypothesized by Vroom's expectancy theory. It also examined the behavioral characteristics of the variable expectancy. The research involved a decision making exercise to capture the course preference and behavioral choice (effort) policies of 50 Air Force Institute of Technology graduate students. Three course factors, Grade Point Average, regard of classmates, and a feeling of personal satisfaction, captured the valence policy. These same factors, plus the expectancy variable, captured the effort policy. The data were supportive of both the valence and effort models; i.e. - the ability of the models to explain variation in the data, and the interactive nature of the differing components, were both substantiated. For the valence model, the mean R2 was .8243, which attests to not only the internal reliability of the instrument, but also to the consistency of the model. For this sample, the data yielded a dichotomous version of expectancy (values 0 and 1).

AD-A076 278/1 Not available NTIS
Royal Ministry for Foreign Affairs Stockholm (Sweden)
Psychosocial Stress. Population, Environment and Quality of Life,
Lennart Levi , and Lars Andersson. 1975, 8p
Availability: Pub. in Ekistics, v236 p12-19 Jul 75 (No copies furnished by DTIC).

No abstract available.

AD-A076 299/7 PC **A04**/MF **A01**
Missouri Univ-Columbia Tailored Testing Research Lab
Problems in Application of Latent Trait Models to Tailored Testing.
Technical rept.,
William R. Koch , and Mark D. Reckase. 27 Sep 79, 54p Rept no. RR-79-1
Contract N00014-77-C-0097

Computerized tailored testing procedures have been successfully applied in the past to the measurement of aptitude or ability. The latent trait models employed in these procedures make the basic assumption that the underlying latent trait being measured is unidimentional. However, achievement tests are commonly found to measure several factors. The purpose of the present research was to study the effects of using tailored tests for achievement measurement, knowing that the unidimensionality assumption would be violated. Of equal importance to the study was a comparison of the one- and three-parameter logistic models to each other as well as to a traditional paper-and-pencil achievement test. A total of 110 undergraduate students enrolled in an introductory educational psychology and measurement course at the University of Missouri-Columbia served as examinees for the study. A counterbalanced test-retest design was employed in which there were two separate test sessions one week apart for each examinee, with both the one- and three-parameter tests administered at each session. The results of the study indicated that neither tailored test procedure performed as well as the traditional course exam in terms of reliability. However, the three-parameter procedure had higher test information and better fit of observed responses to the model than the one-parameter procedure. Neither the one-parameter nor the three-parameter tailored tests yielded satisfactory content validity. The attitude scale results indicated generally favorable student attitudes toward tailored testing.

ED-167 185 Not available NTIS
Measuring Attitudes and Instructional Development: Why and How,
Michael Simonson. 8 Mar 79, 23p
Paper presented at the Annual Meeting of the Association for Educational Communications and Technology, New Orleans, LA, March 6, 1979. Portions of this document are not fully legible.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210, PC$1.67, MF$0.83 Plus Postage.

Attitudes and attitude measurement are critical components of teaching and learning and the instructional developer should collect as much relevant data about that process as possible. It is important for instructional developers to study the attitudes of learners in order to demonstrate attitude/achievement relationships, promote attitudinal position, reduce attitudinal influence, and to assess the impact of specific instruction. Attitude measurement should be valid, reliable, replicable, and fairly simple to administer, explain, and understand. Categories for collecting attitude information include self-reports, reports of others, sociometric procedures, and records. To insure effective attitude measurement, one must identify the construct to be measured and find an instrument that will measure the relevant construct. If no existing measure is available, the instructional developer will need to construct his/her own test, recognizing the critical importance of reliability and validity of information. A pilot study should be conducted in order to revise tests for actual use. When testing is completed, resulting data must be summarized, analyzed, and displayed for the consumer. A bibliography and examples of the measurement process are included.

HRP-0030042/6 Not Available NTIS
Forsyth Technical Inst., Winston-Salem, NC.
Supporting the Hospitalized Elderly Person.
Ann Lore. Mar 79, 4p
Pub. in American Jnl. of Nursing v79 n3 p496-499 Mar 79.

This article deals with helping elderly patients to cope with hospitalization and the psychological potential of nurses to provide assistance. Because self-esteem is an important aspect of personality, particularly for the elderly, hospitalization often represents a crisis situation for older persons. Nurses should learn to be supportive of these persons while fostering independence so that the elderly can respond to future stress in a more positive way. The maturity or security of nurses can affect their ability to care for the elderly. On the other hand, the fears of elderly patients about the unknown can be expressed in unreasonable demands. Adjustment to hospitalization begins at the time of admission. Patients should be allowed to keep their personal articles with them. Nurses should explain who will be responsible for their care on the various shifts. It is important to listen to the comments of patients without belittling them. It is also necessary to recognize that patients who are anxious and frightened often react with hostility. Response time for elderly persons is slower and should be considered in the provision of care. When possible, patients should be encouraged to

direct some of their own care. Bereavement is common among elderly patients and their families. Nurses should be aware of how various family members interact.

PB80-118755 PC **A09**/MF **A01**
National Inst. on Drug Abuse, Rockville, MD. Div. of Research.
The Behavioral Aspects of Smoking,
Norman A. Krasnegor. Aug 79, 199p DHEW/PUB/ADM-79/882, NIDA/RD-79/31
Also pub. as National Inst. on Drug Abuse, Rockville, MD. Div. of Research, Research Mono. 26. Library of Congress catalog card no. 79-600141. See also report dated Jan 79, PB-297 721.

The chapters of this monograph are reprinted from Part II, Report of the Surgeon General on Smoking and Health (1979). They are presented here with an introduction by Norman A. Krasnegor, Ph.D. The purpose for reprinting this material as a separate NIDA monograph is to provide a compact summary of current biological, behavioral, and psychosocial research on cigarette smoking behavior. Each chapter, including the introduction, provides extensive reference lists.

5K. Sociology

PB80-105380 PC **A04**/MF **A01**
Michigan Joint Special Committee on Aging, Lansing.
Report to the Michigan 79th Legislature Regular Session of 1978, Joint Special Committee on Aging.
12 Dec 78, 74p

The report discusses the progress made by the state government of Michigan on concerns of elderly citizens. Specific state department programs considered important to senior citizens are outlined. An overview of senior citizen issues, involvement, and state legislative action are presented.

PB80-106602 PC **A02**/MF **A01**
Colorado Univ., Boulder. Natural Hazards Research and Applications Information Center.
Natural Hazards Observer, Volume 4, Number 1, September 1979.
Sep 79, 14p NSF/RA-790209
Grant NSF-ENV76-05682
See also Volume 3, Number 4, dated June 79, PB-299 407.

The feature article describes the creation and objectives of the Federal Emergency Management Agency (FEMA) which consolidates a variety of emergency management activities into a single agency. An article on the proceedings of the Fourth Annual National Hazards Research Workshop (7/27-8/1) includes lists of research presentations, new research abstracts, conference summaries, public interest group abstracts, and program/project abstracts. Some preliminary findings entitled, 'Dissemination of and Response to Natural Hazard Warnings' are reported. 'Washington Update' includes articles on land acquisition to reduce flood losses, new additions to FEMA, and a study undertaken by the Water Resources Council (WRC) on nonstructure flood plain management. Subjects of conference announcements include coastal meteorology, stormwater management, Florida hurricanes, earthquake engineering, American shore and beach preservation, and disaster relief. Grant announcements involve state mitigation options, an emergency assistance handbook update, disaster recovery training, evacuation behavior in disasters, and earth covered buildings. Other articles report conclusions of a research project on the effects of flood plain regulations, the publication of a disaster handbook for extension agents and private individuals, announcements of new monographs, a church response handbook, a mayors' resolution conference, and recent publications.

PB80-109200 PC **A04**/MF **A01**
National League of Cities, Washington, DC.
Urban Observatory Research Reports.
Annotated bibliography,
Mar 76, 73p HUD-0000243

The reports listed and annotated in this bibliography are the products of research undertaken by the large city urban observatories during the period in which they were funded by HUD. Reports produced by these observatories since the termination of HUD support and reports prepared by the smaller city urban observatories are not included in this bibliography. The Urban Observatory Program, an effort to assist city officials in dealing with problems facing the nation's cities, is briefly described at the outset, and the urban observatories providing reports are listed. The bibliography is arranged topically according to the descriptor categories used in "Urban Affairs Abstracts." Two categories, "Citizen Attitudes" and "Urban Observatory Reports and Evaluations," have been added. Where appropriate, reports are listed under more than one descriptor category to reflect additional subject areas covered in the reports. Comparative studies undertaken by three or more observatories are listed in the areas of citizen participation, citizen attitudes, municipal finance, social indicators, substandard housing, manpower policies, housing policies, and regional economic analysis. Annotated reports are listed under the following topics: aging, citizen attitudes, citizen participation, city profiles, communications, community development, crime, criminal justice and law enforcement, demography, economic development, education, employment and labor, environment, finances, government, health, housing, indicators, land use and development, minorities, municipal administration, politics, public policy, public safety, public works, recreation and parks, social services, transportation, and urban observatory reports and evaluations.

PB80-109234 PC **A05**/MF **A01**
International City Management Association, Washington, DC. Management Development Center.
'701' Planning and Management. 39 Program Ideas.
Ann Branston, Charles J. Schwabe, and Nancy Schamberg. 1977, 97p HUD-0000249

More than 400 projects funded under the Comprehensive Planning Assistance Program (Section "701") between 1971 and 1976 were reviewed by committees composed of members of the International City Management Association and the American Institute of Planners to select the 39 presented here. These program ideas were selected because they were innovative, dealt with common governmental problems, could be transferred to other jurisdictions, could be sustained over time, involved a wide range of elected and appointed officials, involved the private sector, or did an outstanding job of involving citizens, especially minority citizens. (Both the criteria and the names of the committee members are appended.) Each project is represented by a two - page summary which gives its background, implementation, and impact. The name and address of a contact person is also given. The program ideas cover policy planning and evaluation, fiscal management, land use planning, housing, energy, environmental management, economic development and redevelopment, technical assistance, historic preservation, management information systems, and productivity improvement. There are indices of the projects by program type, by agency type, and by geographical area.

PB80-109242 PC **A09**/MF **A01**
Low Income Housing Development Corp., Durham, NC.
The Place I Belong. A Report on Southern Rural Housing. Volume I: What About Tomorrow. Part I: Appalachia, the Mississippi Delta, and the Ozarks. Findings and Conclusions.
Final rept.,
Barbara N. Smith, Judith Fortney, and David Chapman. Dec 73, 191p HUD-0000251

This study represents the first of a two - phase effort to determine how the Federal Government should spend scarce resources to improve housing of low - income families in southern rural areas. Findings are based on a 20 - month examination of 12 planning and development districts located in Appalachia, the Mississippi Delta, and the Ozarks. The major housing problems in the rural areas studied consisted of incomplete plumbing and major structural deficiencies within the units themselves. The rural housing problem is complicated by the following factors: (1) the largest share of this substandard housing is occupied by persons 65 years of age or older; (2) the greater proportion of such housing is occupied by persons who live rent free; (3) rural substandard housing tends to be isolated; (4) standards concerning complete plumbing are based on public health considerations for urban areas; and (5) the rural family's satisfaction with or attachment to a house does not seem to be related to its condition as described by housing standards. Particular study findings relate to housing market analyses, consumers, housing conditions, financial institutions, Farmers Home Administration, builders, mobile homes, development and delivery mechanisms, economics, financial secondary data, and census and legal findings. A discussion is included also on supply of and demand for rural housing in the areas studied. An appendix describes the sample selection procedure and survey instruments. A list of abbreviations is included.

PB80-109259 PC **A04**/MF **A01**
Polk (R. L.) and Co., Detroit, MI. Urban Statistical Div.
Vacant Housing Units in the Springfield, Illinois Market Area.
21 May 77, 70p HUD-0000252
Contract HUD-H-2651

A set of 64 tables are presented containing vacancy information for Springfield, Ill., and surrounding areas. Current counts for this report were taken from a canvass made for the city directory during the period January 3, 1977, to May 21, 1977. Housing units refer to living quarters occupied by a person identified in the Polk canvass as a head of household or vacant quarters normally so occupied. Current year vacancies include housing units which were identified as occupied in the previous canvass (January 5, 1976, to May 15, 1976) and are now vacant and newly constructed units which are vacant. Two - canvass vacancies consist of housing units that were found vacant at the time of the 1976 and 1977 Polk canvasses. Polk's basic unit of control in compiling this report is the street address; a street address is equivalent to a structure, and the count of housing units at an address usually reflects the number of units in a structure. Net change in vacancies consists of three components: (1) change due to added or deleted street addresses (structures); (2) change in the occupancy of existing housing units; and (3) change due to vacant units added or deleted in existing street addresses. A map of the Polk enumeration district is included.

PB80-109267 PC **A07**/MF **A01**
Polk (R. L.) and Co., Detroit, MI.
Vacant Housing Units in the Baton Rouge and Baton Rouge Suburban, Louisiana Market Area.
14 May 77, 145p HUD-0000253
Contract HUD-H-2651

This volume of 132 tables furnishes information on housing vacancies for Baton Rouge, La., and the surrounding area. Cities included in the report are Baton Rouge, Broadmoor, West Baton Rouge, Baker, Denham, Greenwell Springs, Port Allen, and Zachary. Current counts are taken from the canvasses made during the period February 7, 1977, to May 14, 1977. Housing units are defined as living quarters occupied by a person identified in the canvass as a head of household or vacant quarters normally so occupied. Current year vacancies include housing units identified as occupied in the previous canvass (1976) that are now vacant and newly constructed units which are vacant. Two - canvass vacancies are housing units that were found vacant at the time of the 1976 and 1977 canvasses. Polk's basic unit of control in compiling this report is the street address; a street address is equivalent to a structure, and the count of housing units at an address usually reflects the number of units in a structure. Net change in vacancies consists of three components: (1) change due to street addresses (structures) added or deleted; (2) change in the occupancy of existing housing units; and (3) change due to vacant units added or deleted in existing street addresses. Eight enumeration district maps for the area are included.

PB80-109275 PC **A07**/MF **A01**
RAND Corp., Santa Monica, CA.

Completing the Supply Experiment. Housing Assistance Supply Experiment.
Working note,
Jun 78, 130p HUD-0000254
Contract HUD-H-1789

The Housing Assistance Supply Experiment (HASE) was designed to measure the marketwide effects of a full - scale allowance program on the price and quantity of housing services available to consumers. Analysis of the first 2 years of program data, including two series of landlord and household interviews, indicates that the program helps participants but has little effect on others. In light of this finding, initial research plans focusing on measuring marketwide effects should be reviewed and adjusted. The HASE staff proposes that continued research measure the quantity of housing services but with a new emphasis on cross - sectional as distinguished from longitudinallanalysis. HASE research on residential mobility and neighborhood change shouldMbe directed at three goals: (1) monitor the frequency and spacial patterns of enrollees' moves, (2) determine the effects of the program on recipients' mobility and their neighborhoods, and (3) increase understanding of the process of local mobility and its implication for Federal housing policy. HASE should seek explanations for the low rates of participation in transfer programs, generally, and housing allowance programs specifically, and for the different participation rates of various types of households. The program's effect on participants should still be examined, and research on community and client attitudes should shift from concern with the general diffusion of program knowledge and acceptability to more specific topics. Baseline data include surveys of landlords, households, residential buildings, and neighborhoods, and a postbaseline survey audit is suggested. (Author abstract modified).

PB80-109291 PC **A06**/MF **A01**
Tulsa Housing Authority, OK.
Housing allowance Experience at the Tulsa Housing Authority.
Final rept.,
Oct 75, 110p HUD-0000256
Contract HUD-H-2099R

This detailed evaluation with recommendations examines the Experimental Housing Allowance Program administered by the Tulsa, Okla., Housing Authority during 1973 and 1974. The initial planning and administration are set forth, changes which were made in response to problems encountered in recruitment and processing are explained, and the final program structure is outlined. Charts, tables, and graphs present study data. It was found that this program was easier to administer than a rent collection program, that it facilitated the use of existing vacant housing, and that it supplemented existing housing programs. A dual - payee check system was established to reduce fraud and lost checks. A check made out to both the landlord and the tenant is mailed in a nonforwarding envelope. Difficulties were encountered in enrollment because the problem was complex and hard to explain. A media blitz and a mobile enrollment office were used to overcome these problems. A local problem was encountered because the experiment mandated that recipients reflect the racial composition of proverty families in the area, and 77 percent of these were white. Racism was then charged. It was found that many recipients needed counseling during the entire life of the program (particularly elderly persons) and that unstable families could not survive in the open housing market. Recommendations are made for handling these groups. The housing allowance is compared with other programs and its place in a total plan is assessed. Appendices present samples of forms used and additional data.

PB80-109325 PC **A15**/MF **A01**
Massachusetts Inst. of Tech., Cambridge.
Community Analysis System. Volume I: Technical Description.
User's manual,
Sheryll A. Weber, William L. Parsons, and David L. Birch. Sep 77, 337p HUD-0000261
Contract HUD-H-2165R

The Community Analysis System consists of a set of computer programs built around a single data base structure. Variations from city to city are in the numbers specified in the data base, thus allowing for one flexible set of programs. The programs now operating for five metropolitan areas (New Haven, Conn., Worcester, Mass., Dayton, Ohio, Houston, Tex., and Charlotte, N.C.) can be adopted elsewhere without code changes. This volume describes the technical operation of the model and the interrelationship of the components of its supporting structure. Categorized variables for which data are gathered are population, households, jobs, land use, and housing, all according to geographic breakdown within each city. Individual items about which data are gathered within each of the broad categories are indicated. The programs used to develop the data base are presented, and the following information is included: purpose, major variables, files, description, utilities, memory, diagnostics, fatal errors, running instructions, and sample output. The same information is provided for programs which facilitate the production of probability density functions to determine actual location choice of households and jobs. Separate descriptions are provided for each subroutine composing the model, and their interrelationship is indicated. A set of utilities which perform a specific function and are referenced by more than one program are also described. Each individual program description contains a list of the utilities it requires for execution. The programs used to print out the numbers stored in the data base are described and documented, along with the programs used for maintaining the computer file. An index for the various programs is provided.

PB80-109333 PC **A21**/MF **A01**
Massachusetts Inst. of Tech., Cambridge.
Community Analysis System. Volume II: FORTRAN Code.
User's manual,
Sheryll A. Weber, William L. Parsons, and David L. Birch. Sep 77, 479p HUD-0000262
Contract HUD-H-2165R

This volume contains the FORTRAN code for the computer programs described in the first volume of this user's manual. The Community Analysis System consists of a set of computer programs built around a single data base, with built - in flexibility so as to be useful for more than one city. Cities currently using the programs are New Haven, Conn., Worcester, Mass., Dayton, Ohio, Houston, Tex., and Charlotte, N.C. Programs included are those which are used to develop the data base, to facilitate the production of probability density functions for determining actual location choice of households and jobs, to print the desired output, and to maintain the file.

PB80-109358 MF **A01**
Urban Systems Research and Engineering, Inc., Cambridge, MA,
Urban Homesteading Catalogue. Volume 2: Selecting Neighborhoods. Selecting Properties. Attracting and Selecting Homesteaders.
Sybil Phillips. Aug 77, 139p HUD-0000269, HUD/PDR-264/2
Paper copy available from the Sup. of Docs., Stock number 023-000-00416-0

This second volume of a catalog stemming from the efforts of 23 demonstration cities to implement an urban homesteading program through the Federal Housing and Community Development Act of 1974 focuses on the selection of the participants; i.e., the neighborhood, the homestead property, and the homesteader. Factors which lead to the selection of a particular neighborhood and the participants in the selection process are considered. Property selection is addressed, drawing on the experience of the demonstration cities, as well as the timing of property selection and factors influencing the selection process. The task and factors influencing the selection process. The task of attracting applicants and selecting homesteaders from the applicant pool involves publicity; efforts of various demonstration cities are discussed. The choice of media and the content of announcements about the homesteading program affect the level of the applicant response and the nature of the applicant pool. Alternative approaches for screening applicants include both objective and subjective measures to match homesteaders with homestead properties. Profiles of selected neighborhoods, neighborhood preservation programs, applicants, and homesteaders from each of the demonstration cities are presented in the appendix. (Author abstract modified).

PB80-109366 MF **A01**
Urban Systems Research and Engineering, Inc., Cambridge MA.
Urban Homesteading Catalogue: Volume 3: Background and History of Urban Homesteading. Demonstration Program Descriptions.
Sybil Phillips. Aug 77, 169p HUD-0000270, HUD/PDR-264/3
Paper copy available from the Sup. of Docs., Stock number 023-000-00417-8

This final volume of a catalog that has issued from the efforts of 23 demonstration cities to implement an urban homesteading program under the Federal Housing and Community Development Act of 1974 examines the broad concept and practice of homesteading as a mechanism to encourage settlement or, in the case of urban homesteading, resettlement of selected areas. The historical context of the Urban Homesteading Demonstration Program is traced from experiments in homesteading undertaken by local governments in the early 1970's. Federal legislation culminated in Section 810 of the Housing and Community Development Act of 1974. Homesteading efforts on the American frontier and the concept of subsistence homesteading are considered in relation to the design of the Urban Homesteading Demonstration. Complete descriptions of the local homesteading programs in each of the 23 demonstration cities include background information and an overview of the operational procedures and administrative structure. These descriptions correspond to the key elements of program design discussed in the other volumes, but the focus here is on the entire working program in a particular city. (Author abstract modified).

PB80-109374 PC **A03**/MF **A01**
Department of Housing and Urban Development, Washington, DC. Office of the Assistant Secretary for Policy Development and Research.
How Well Are We Housed. 1. Hispanics.
Ruth Limmer. Sep 78, 27p HUD-0000274

Part of a much larger, more technical study on the housing conditions of various groups of Americans is summarized. Housing conditions are considered for the ethnic group composed of Central and South Americans, Cubans, Mexican - Americans (Chicanos), Puerto Ricans, and others of Spanish or Spanish - speaking origin living in the United States. Membership in this group, which is determined by the survey respondent when he or she identifies the head of household, implies no racial or language criteria. Data for the report are from the Annual Housing Surveys for 1975 and 1976, collected for HUD by the Census Bureau. Tabular data are provided which measure the following housing concerns: (1) physical adequacy, which considers the availability of heating and plumbing, structural soundness, the availability of sewage disposal systems, and the maintenance of the living unit; (2) overcrowding, with a living unit defined as overcrowded if it contains more than 1 person per room; and (3) affordability, which measures the ability of a family to pay for adequate housing, given the space it needs for its size. Findings are provided in narrative summaries. It is concluded that Hispanics have worse housing than Americans in general; their housing is flawed particularly from deficiencies in maintenance and heating, followed by poor access to toilet facilities. The proportion of income paid for housing is greater for Hispanics than for the average American, and the housing they live in tends to be older. Disparities among the housing conditions of Hispanic groups themselves were found to be greater than between Hispanics in general and the American public. Puerto Ricans live in the worst housing, with 27.1 percent flawed, while Cubans tend to live in the best housing, with only 9.8 percent of their housing considered flawed.

PB80-109382 PC **A08**/MF **A01**
Ketron, Inc., Wayne, PA.
Examination of State Laws Prohibiting Sex and Marital Status Discrimination in Housing and Home Finance.
Final rept.,

Mar 78, 152p HUD-0000275
Contract HUD-H-2347R

Results of an intensive examination of laws prohibiting discrimination based on sex and / or marital status in housing and home finance are reported for a sample of States administering such laws. Research was conducted in 11 States over a period of 13 months in 1976 and 1977 using the following methods for gathering data: administration of a set of detailed, interrelated survey instruments to State agency enforcement staff; interviews with spokespersons for various advocacy and interest groups in 6 of the 11 States; a case review of all sex and marital status housing complaints handled by the 11 agencies between January 1975 and June 1976; and the application of a variety of data manipulation techniques to the information gathered. The basic question asked of each statute and implementation procedure was whether victims of sex or marital status discrimination in housing can obtain just and expeditious relief for their injuries. Study findings are presented under the following subjects: (1) scope of statutory coverage for sex and marital status discrimination in housing and home finance, (2) relationship to Federal law, (3) publicity and intake, (4) administrative investigation, (5) administrative remedies, and (6) alternatives to administrative case processing by State enforcement agencies. Based on the findings, recommendations are offered for the Department of Housing and Urban Development and State agencies. The appendix discusses site selection methodology.

PB80-109416 PC **A02**/MF **A01**
Department of Housing and Urban Development, Washington, DC. Office of the Assistant Secretary for Policy Development and Research.
Experimental Housing Allowance Program.
1974, 19p HUD-0000279

The HUD Experimental Housing Allowance Program is a 5 - year test during which a wide variety of housing allowance alternatives are being tried in carefully selected areas of the country to develop successful program components and determine how the housing allowance concept compares in practice to earlier or existing program approaches. The housing allowance experiment has three components, each designed to answer a different set of questions about the program. A 3 - year demand (consumer) experiment measures the response of recipients to different types and levels of allowances. A 5 - year supply (market) experiment measures the response of the housing market when large numbers of families receive allowance payments. A 2 - year administrative agency (management) experiment identifies administrative costs and methods that result in effective housing allowance program management. The following policy issues need to be addressed: whether families can improve their housing at costs equal to or lower than those of existing housing programs; whether the allowance is equitable in treating all families; how abuses might arise, and how they can be prevented; whether allowances result in greater purchasing power; what kind of responses to the program are being obtained from bankers, brokers, realtors, and other program intermediaries; and whether administrative costs will be in line with program benefits.

PB80-109515 PC **A03**/MF **A01**
City-Wide Development Corp., Dayton, OH.
Developing a Local Housing Strategy. A Guidebook for Local Government.
William J. Schneider, and Gary Conley. Nov 78, 36p HUD-0000351, HUD/PDR-352/1
Contract HUD-H-2422
Prepared in cooperation with National Community Development Association, Washington, DC.

This guidebook helps jurisdictions involved in community block grant programs to formulate formal housing assistance plans. Housing offers services in addition to physical shelter: the neighborhood environment, public services, public utilities, location, and a security investment. Housing price structures reflect the prices of these various components. Housing development in a community can be influenced by the relative value of different components of the service bundle, the supply or demand for housing, of the private market institutions (financial institutions, real estate brokers, etc.). Neighborhood status also affects the market.

PB80-109531 PC **A99**/MF **A01**
RAND Corp., Santa Monica, CA.
Codebook for the Survey of Landlords. Site II, Wave 2. Housing Assistance Supply Experiment.
Final rept.,
Patricia Boren. Dec 78, 607p HUD-0000355
Contract HUD-H-1789

Part of the Housing Assistance Supply Experiment, this working note describes the data gathered in the wave 2 survey (April through August 1976) of landlords in St. Joseph County, Ind., and provides detailed guidance for their use. The survey was conducted for four purposes: (1) to obtain data on the characteristics and circumstances of the owners and their activities in the real estate market; (2) to elicit their perceptions of the neighborhood housing market and the investment prospects of their property; (3) to obtain information on the landlords' management policies and on their relationships with tenants and suppliers of supporting services; and (4) to obtain a detailed account of the landlords' mortgage financing and their income and expenses from the property during the preceding year. Following an introduction providing general information about the survey instrument (included), field procedures, and operations performed on the data returned from the field, a complete codebook for the survey is presented containing detailed information on each response field and the actual response frequencies. Each question from the survey instrument is reproduced exactly as it appeared, along with any precoded responses. Below the question, information bearing on the interpretations of the question or of responses to it is added; i.e., new codes authorized for use in the field or during data processing, authorized changes to skip patterns, and various instructions to fieldworkers and editors. The source of each item of additional information is also noted. General definitions that guided the fieldwork are appended.

PB80-109549 PC **A24**/MF **A01**
RAND Corp., Santa Monica, CA.
Codebook for Survey of Landlords. Site II, Baseline. Housing Assistance Supply Experiment.
Final rept.,
Jul 76, 575p HUD-0000356
Contract HUD-H-1789

As part of the Housing Assistance Supply Experiment, this working note describes the data gathered in a baseline survey of participating landlords in St. Joseph County, Ind., and provides detailed guidance for their use. The survey was conducted for four purposes: (1) to obtain data on the characteristics and circumstances of the owners and their activities in the real estate market; (2) to elicit owners' perceptions of the neighborhood housing market and the investment prospects of their property; (3) to obtain information on the landlords' management policies and on their relationships with tenants and suppliers of supporting services; and (4) to obtain a detailed account of the landlords' mortgage financing and their income and expenses from the property during the preceding year. Following an introduction providing general information about the survey instrument (included), field procedures, and operations performed on the data returned from the field, a complete codebook for the survey is presented, including detailed information on each response field and the actual response frequencies. The codebook is organized as follows: each question from the survey instrument is produced exactly as it appeared, along with any precoded responses. Below the question, information bearing on the interpretation of the question or of responses to it is added. This includes new codes authorized for use in the field or during data processing, authorized changes to skip patterns, and various instructions to fieldworkers and editors. The source of additional information for each new item is also noted. General definitions that guided the fieldwork are appended.

PB80-109580 PC **A06**/MF **A01**
Urban Inst., Washington, DC.
Documentation for Section 8 Core Data Base.
Margaret Drury, Peter Greenston, Clara Hager, Sarah James, and Jayne Seeley. Dec 78, 121p HUD-0000365
Contract HUD-H-2162R

This transmittal includes all material necessary to document a computer tape with information collected in the fall of 1976 for an evaluation of the first year of operation of the Section 8 Existing Housing Program. It contains four sections: (1) directions for use in accessing the tape on the computer; (2) explanation of the abbreviations, the question numbering system, and a description of the data fields; (3) all the core questions developed on key topics which were designed for use in the nationwide data collection effort; and (4) core survey items which were modified plus discrepancies which were encountered. There were four questionnaires designed for the survey, a household instrument, a lanlord instrument, one for the housing agency administering the program, and one for the HUD Area Office. Copies of each are included. Three contractors participated in the data collection. Because of modifications which were made to the core questions, some items are more comparable across contractors than others. The major disparities occurred because questions were eliminated or words were changed, skip patterns differed, and households who moved were not recorded as having been searched. The fourth section discusses the survey instruments item by item to point out disparities among contractors. A brief final section reviews reasons for these disparities.

PB80-109622 MF **A01**
Department of Housing and Urban Development, Washington, DC. Div. of Policy Studies.
Housing for the Elderly and Handicapped. The Experience of the Section 202 Program from 1959 to 1977.
Jan 79, 143p HUD-0000371
Paper copy available from the Sup. of Docs., Stock number 023-000-00499-2

Results are presented of an evaluation of HUD's Section 202 program. Section 202, enacted as part of the Housing Act of 1959 to provide "independent living" for elderly and handicapped persons, authorizes direct loans to nonprofit organizations for developing and operating multifamily housing projects. The evaluation addresses these issues: population being served, character and quality of project housing, efficiency of the program in management of government funds and in reducing tenant rents, and financial viability of the projects. Major elements of the study design were a review of program history and operations, collection of inventory data on all projects, direct observation of projects, and interviews with project sponsors, managers, field office staff, representatives of public housing authorities, and local social service agency personnel. Findings reveal that the program serves mainly white, elderly females with moderate - to - middle incomes. Males, blacks, other minorities, the handicapped, and persons with very low incomes are less frequently served. Section 202 projects are generally well designed and are located in safe areas with access to services. Section 202 project construction is as cost effective as that of two other subsidy projects for the elderly and more efficient in terms of reductions of rent per dollar of subsidy. Section 202 projects have shown a high degree of financial viability over the life of the program. Despite its basic strengths, the program does sponsor projects which vary significantly in quality and extent of services. The overall success of the program is attributed to its design features, small scale, unified management structure, and targeting to elderly persons. Detailed findings and tabular data are provided, and a list of HUD - funded housing programs for the elderly and handicapped, and descriptions of cost effectiveness (technical analysis), and of subsidies, rent reductions, and subsidy efficiency analysis are appended.

PB80-109630 MF **A01**
AIA Research Corp., Washington, DC.
An Evaluation of Housing for the Severely Disabled. In the Context of a Service Delivery System.
Edward R. Ostrander, Bettye Rose Connell, Janet Reizenstein, and Leonard Olson. 1976, 76p HUD-0000372, HUD/PDR-364
Contract HUD-H-2608
Paper copy available from the Sup. of Docs., Stock number 023-000-00500-0

This report describes the philosophy, approach, and findings of a postoccupancy evaluation of Creative Living, an 18 - unit apartment complex for

quadriplegics in Columbus, Ohio. The major aims of this study are to establish what can be learned about designing supportive living environments for the severely disabled, to identify insights into the financial and political processes affecting the development of such facilities, and to determine whether a quick, inexpensive, and trustworthy approach to postoccupancy evaluation is useful to architects and community groups planning housing for the disabled. The evaluation team spent 4 days at the site interviewing 17 residents, observing the design features, and photographing the layout of the individual units and the facility as a whole. In addition to project the background, the design process, the effectiveness of the design solutions, service delivery systems for the severely disabled, and the dynamics of project - HUD interaction, a summary of the evaluation results is provided in outline form. The appropriateness of each design feature (e.g., access to appliances, bathrooms, outside) is noted, along with suggestions for upgrading those features found wanting. Photographs are included.

PB80-109648 PC **A09**/MF **A01**
RAND Corp., Santa Monica, CA.
Eligibility and Enrollment in the Housing Allowance Program: Brown and St. Joseph Counties Through Year 2. Housing Assistance Supply Experiment.
Final rept.,
Lawrence W. Kozimor. Aug 78, 180p HUD-0000374
Contract HUD-H-1789

The eligibility and enrollment of persons in Brown County, Wis., and St. Joseph County, Ind., in the HUD Experimental Housing Allowance Program (a cash allowance program providing rent and utilities funds to clients who locate desirable housing) is reported for the first 2 years of the program. The data collected from annual field surveys show that households eligible under current rules concerning income, assets, and family composition differ substantially in their enrollment patterns and the nature of their benefits from the program. Baseline sample surveys of households in each site show that about a fifth of the site populations are eligible, and that more homeowners than renters are eligible. Four types of households constitute 85 percent of all eligibles in each site: young couples with young children, single parents, elderly couples, and elderly single persons. The likelihood of both enrolling and maintaining eligibility correlates strongly with differences in the sources, amounts, and stability of income. Enrollment was leveling off in Brown County with 42 percent of eligibles enrolled at the end of 2 years, but still climbing in St. Joseph County with 34 percent of the eligible population enrolled. Over one - third of all program enrollees in each site had terminated by the end of the second program year. These findings suggest that, to target housing allowances efficiently, eligibility tests other than income, assets, and family composition should be considered. Stage in the household life cycle and usual source of income both bear strongly on the enrollment decision. Further findings, recommendations, tabular data, and references are provided. (Author abstract modified).

PB80-109655 PC **A10**/MF **A01**
RAND Corp., Santa Monica, CA.
Codebook for the Survey of Residential Buildings, Site II, Baseline. Housing Assistance Supply Experiment.
Working note,
Deborah Hensler, Patricia Boren, Nancy Hope, Charles Noland, and Larry A. Day. Sep 77, 209p HUD-0000375
Contract HUD-H-1789

A codebook for the 1975 baseline survey of residential buildings in Site II (St. Joseph County, Ind.) of the Housing Assistance Supply Experiment is presented. The codebook reproduces each question in the survey instrument, specifies all permissible responses, and annotates each question with interpretations made at various stages of training, field operations and editing, and subsequent data processing. It also includes "marginals" for each question -- tabulations of all responses recorded in the preliminary master file of survey records. The survey of residential buildings will be carried out by field workers visiting each property in the sample. Data accumulated will provide information on the following: (1) descriptions of the buildings and their conditions, so that improvement or deterioration over time can be detected, (2) information for appraising the property's market value so that the owner's initial investment position can be established, and (3) input into the construction of hedonic indexes for estimating the implicit prices of underlying housing attributes (such as number of rooms). The evaluation constitutes a limited check on the accuracy of participants' responses to other surveys. Information on the organization of the codebook is provided and the codebook reproduction includes a section on property and building, a validation form, a refusal / breakoff report, and derived data elements. A glossary, list of audit codes, and explanation of data element files are appended. (Author abstract modified).

PB80-109663 PC **A03**/MF **A01**
RAND Corp., Santa Monica, CA.
Monitoring the Housing Allowance Program in St. Joseph County, Indiana: January-March 1977. Housing Assistance Supply Experiment.
Working note,
Wim Wiewel, and Nancy O'Neil. 43p HUD-0000376
Contract HUD-H-1789

St. Joseph County, Ind., community events, activities, and attitudes are described that can affect the HUD Experimental Housing Allowance Program and research issues addressed by the Housing Allowance Supply Experiment. The housing allowance program provides direct cash assistance to low - income families to upgrade their housing. This report covers a 3 - month operation period in 1977. It provides a brief statistical overview of program operations, discussing in particular the drop in both the number of clients authorized to receive payment and the percentage of dwellings that passed housing evaluations, and it summarizes events affecting the program. Significant events include the intensive campaign to publicize the third wave of tenant and homeowner surveys conducted by Rand Corporation, the flareup of a controversy between Rand and the South Bend Housing Authority over a Rand report on allowance program effects on Federal housing in South Bend, the resolution of two cases of alleged discrimination against clients in their search for housing, and a new housing allowance office advertising campaign directed toward the elderly. The reactions of individuals and groups to the program are also discussed. A series of "good neighbor" meetings were held by clients, eligibles, and noneligibles during which both clients and nonclients expressed strong support for the program. Several participants, however, objected to such aspects as the lack of front - end money. The report discusses events affecting the way housing service suppliers respond to the program, including an effort by the city of South Bend to annex suburban Clay Township and acquire Clay utilities and the continued withdrawal of Associates Corporation of North America from St. Joseph County -- a move predicted to result in a loss of 2,902 jobs to South Bend and a net loss of 6,600 people. Finally, the report presents special site monitors' studies on crime in the county and residents' opinions about city services and the downtown area.

PB80-109671 PC **A99**/MF **A01**
RAND Corp., Santa Monica, CA.
Codebook for the Survey of Tenants and Homeowners, Site II, Baseline. Housing Assistance Supply Experiment.
Working note,
Deborah Hensler, Patricia Boren, Nancy Hope, Mark Menchik, and Kevin McCarthy. Apr 77, 901p HUD-0000377
Contract HUD-H-1789

A codebook for the 1974 - 1975 baseline survey of tenants and homeowners participating in the HUD Housing Assistance Supply Experiment and living in Site II (St. Joseph County, Ind.) is presented. The codebook reproduces each question in the survey instrument and related forms, specifies all permissible responses, and annotates each question with interpretations promulgated at various stages of training, field operations and editing, and subsequent data processing. The codebook also includes "marginals" for each question -- tabulations of all responses recorded in the preliminary master file of survey records. The baseline survey provides longitudinal data on the following: (1) household composition and social background; (2) tenure, characteristics, and condition of housing units; (3) tenant - landlord relationships; (4) perceptions of neighborhood and social participation; (5) housing expenses; (6) mobility and housing history; (7) occupational history and income; and (8) knowledge of the allowance program. The data gathered in the survey are described along with guidelines for their use. Following a discussion of codebook organization, codebook modules (e.g., tenants' characteristics, housing expenses, head of household employment history), the refusal record, vacancy report, validation form, and unit record folder are presented. The appendix contains a glossary, listing of audit codes, item justifications, and a table of site neighborhoods. (Author abstract modified).

PB80-109689 PC **A08**/MF **A01**
RAND Corp., Santa Monica, CA.
Public Knowledge and Evaluation of Housing Allowances: St. Joseph County, Indiana, 1975. Housing Assistance Supply Experiment.
Final rept.,
Phyllis Ellickson. Jul 77, 167p HUD-0000378
Contract HUD-H-1789

This paper reports on communities' attitudes toward HUD's Experimental Housing Allowance Program in St. Joseph County, Ind., to indicate how the general public will perceive the program at baseline (1975), before having actual experience with it. The housing allowance program provides direct cash assistance to low - income families to upgrade their housing. Data derive mainly from special attitude determination questions in the baseline survey of tenants and homeowners, a sample of 4,350 households, conducted in November 1974 and April 1975. The findings show that a maximum of 16 percent of theppopulation in the county was aware of the allowance program at baseline. Public9controversy among political officials and organizational leaders did not filter down to the majority of citizens. Half the persons aware of the allowance program did not possess even minimal information on it or had it confused with another housing program. About 80 percent of the knowledgeable households viewed the program either favorably or neutrally. Opinions about the program generally reflected respondents' views about the scope of government, the competence and honesty of public officials, and the groups expected to benefit from the program. People who opposed neighborhood integration or were hostile to blacks were also significantly more likely to disapprove of the allowance program. About 18 percent of respondents expected the program to affect their own households, while 71 percent anticipated effects on St. Joseph County. Few people thought the program would have undesirable effects, and most expected that it would help people, upgrade housing, and improve conditions in the community. The survey instrument, tabular data, and a bibliography are provided.

PB80-109697 PC **A03**/MF **A01**
RAND Corp., Santa Monica, CA.
Audit of the Baseline Neighborhood Survey in Site I. Housing Assistance Supply Experiment.
Working note,
C. Lance Barnett. Apr 77, 49p HUD-0000379
Contract HUD-H-1789

These baseline surveys of neighborhoods, a survey of neighborhood local sources (NLS) and a neighborhood street observation survey (NSOB), were conducted in Site I (Brown County, Wis.) of the Housing Assistance Supply Experiment (HASE) during the first quarter of 1974. HASE provides direct cash assistance to low - income households to upgrade their living conditions. The NLS survey instrument collected data for 108 areas of various sizes designated as HASE neighborhoods with questions covering land - use patterns, accessibility to public facilities, characteristics of major roads and streets, and measures of air and noise pollution. The NSOB is an observation survey of 8,084 blockfaces in the country. The questions pertain to items such as the presence of single - family housing, commercial structures, and farmland, and conditions of residential buildings, public streets, and vacant land. The blockfaced data were designed to be averaged for each neigh-

borhood. The audit assessed the variation and consistency of average condition ratings and their ability to distinguish between neighborhoods. In general, more than 50 percent of the averages differed from the appropriate grand mean by more than three standard errors, showing that some underlying variation remained. Correlation coefficients between averages for different condition ratings were generally significant and positive. The validity of the average condition neighborhood ratings was measured by using the ratings to rank 12 fabricated "superneighborhoods." The rankings agreed with the expectation and varied little, implying that the average condition ratings can be used in this limited context to distinguish between neighborhoods. The survey instruments and the method of estimating variances for average blockface ratings are provided. (Author abstract modified).

PB80-109705 PC **A03**/MF **A01**
RAND Corp., Santa Monica, CA.
Experimental Housing Allowance Program: An Update of Sec. III of the General Design Report. Housing Assistance Supply Experiment.
Final rept.,
Ira S. Lowry. Apr 75, 45p HUD-0000380
Contract HUD-H-1789

This document is a revision of Section III of Rand's General Design Report (1973) governing eligibility and amounts of assistance offered to individual households participating in HUD's Experimental Housing Allowance Program, a program providing direct cash assistance to low - income families to upgrade their living standards. This updated report explains program administration and funding and provides estimates of program size and cost in each of two experimental sites, Brown County, Wis., and St. Joseph County, Ind. The basic principle of eligibility is that assistance should be available to all households whose income from other sources does not enable them to afford the market price of housing that meets a specified standard of adequacy. According to the income limit formula, the maximum annual adjusted income for an eligible household with a designated number of persons equals the standard annual cost of housing meeting specified quality and size standards minus $480. The size of the allowance will be calculated using a formula that recognizes differences in housing needs and other consumption requirements. The program is designed to fit into the existing system of public assistance programs. Actual program payments begin only when enrollees show that their housing meets certain standards. Once it is approved and funded by Congress, the allowance program will be a permanent feature of local housing markets. This would influence allowance - eligibles to stay in their neighborhoods and housing service suppliers to commit themselves to capital improvements and long - termsinvestments. Program administration would be the responsibility of nonprofitccorporations at each site (Housing Allowance Offices) and funding would be made through local housing authorities. Estimates of potential program size and allowance costs are calculated for the two sites and tabular data are provided.

PB80-109739 PC **A04**/MF **A01**
Department of Housing and Urban Development, Washington, DC.
Computer Use in Code Enforcement.
Richard L. Sanderson. 1978, 51p HUD-0000384

This report provides information on local government use of computer technology in code enforcement and contains case studies of computer use in Chicago, Ill., Cincinnati, Ohio, Colorado Springs, Colo., Milwaukee, Wis., New York City, Philadelphia, Pa., and San Diego and San Francisco, Calif. The data were gathered from a survey of all State governments and of building officials in 30 large cities. The case studies contain information on computer system functions, work volume, and technology use. The city of Chicago uses its computer system in the conservation and technical inspection divisions to print out 120,000 complaints a year on multicopy request - for - inspection forms, print out 300 multicopy violation notices a day from inspection reports and multicopy permits for all technical bureaus, and provide "aging" reports on complaints and violation notices. The Philadelphia department of licenses and inspections' two major divisions use their computer system on housing and building permit information to produce statistical reports containing data of value to the city, State, and Federal Government. The computer provides monthly and annual printouts of permit statistics and housing code enforcement statistics, prints lists of buildings requiring periodic inspections, and calculates fees for overdue licenses. A review of all reported uses indicates that computers fill a variety of statistical and operational functions and provide a number of benefits, including improved service through quick permit issuance and inspection scheduling, more accurate fee calculations, reduced need for clerical help, and automated file maintenance. The statistics that can be developed through analysis of data gathered, sorted, and retrieved are a valuable management tool for the agency and jurisdictions.

PB80-109754 PC **A03**/MF **A01**
Urban Inst., Washington, DC.
Urban Institute Housing Model I: Application to Austin, Texas.
Frank de Leeuw, Raymond J. Struyk, and Sue A. Marshall. 23 May 73, 50p HUD-0000387

This paper reports on an application of a model of housing location and quality to the Austin, Tex., area for the 10 - year interval from 1960 to 1970. The overall project goal is a validated model which can be used to simulate such housing and land use policies as housing allowances, construction subsidies, zoning regulations, or tax changes. More specifically, the Austin experiment seeks a set of estimates of unknown parameters of the model that measure the strength of key behavioral responses of households, builders, and owners of the housing stock. Measures are described concerning how well 11 parameters explain levels of housing services, housing prices, racial segregation, and neighborhood or zonal income differences. Estimates obtained for Austin are contrasted with those obtained for Durham, N.C., the site of the first application of the housing model. With plausible parameter values, the model accounts for many of the differences among zones in racial composition, housing prices, removals, and to a lesser extent, incomes. This model explains differences more effectively than a simpler model which allows housing to depreciate at a fixed rate and ignores neighborhood effects. Parameter values giving the best fit for Austin are remarkably close to parameter values giving the best fit for Durham. On the whole, the results of the application of the model to Austin are quite satisfactory, and two further applications are planned in 1973. Tables and figures illustrate the text, and an appendix lists and describes the general terms used as data inputs into the Austin application of the housing model. (Author abstract modified).

PB80-109762 PC **A03**/MF **A01**
Southern Research Inst., Birmingham, AL.
Mutual Help Homeownership Opportunity Programs for Low-Income Indian Families.
Pearl Tropper, and Sheldon Schaffer. 29 Feb 76, 40p HUD-0000389
Contract HUD-H-1685

A manual is presented for use by Indian Housing Authorities (IHA's) to help establish mutual help homeownership opportunity programs for low - income Indian families in an Indian area. It delineates and describes HUD regulations from Part 805 of "Low Income Housing " and Chapter VIII of Title 24 of the "Code of Federal Regulations." Mutual help housing programs involve groups of families making contributions toward building new houses for each family in the group. Contributions can include cash, land, labor, materials, or equipment but must be equal to at least $1,500 per family. The families, called home buyers, lease their homes from the IHA and make monthly payments based on family income and size. The agencies involved in mutual help programs can be Indian agencies such as the Bureau of Indian Affairs, tribal governments, and IHA's and HUD. The guide describes requirements involved in applying to HUD for mutual help programs, prototype costs, development costs, site selections, and inspections during construction. It covers contracts and eligibility and selection policies. The types and amounts of family contributions are discussed as well as disposition of contributions in the event an agreement is terminated before the home is occupied. Aspects of program termination, home purchases (prices, transfer of title, financing), and home buyer obligations are examined.

PB80-109788 MF **A01**
American Univ., Washington, DC. Center for Public Policy.
Methods of Urban Impact Analysis. No. 2: Neighborhood Self-Help Development.
Edward Greenberg, Charles L. Leven, and James T. Little. Jan 79, 55p HUD-0000391, HUD/PDR-365/2
Paper copy available from the Sup. of Docs., Stock number 023-000-00490-9

The probable urban impacts of a neighborhood self - help program based on President Carter's National Urban Policy calling for a $15 million commitment to self - help programs are analyzed. The President's announcement recognized the role of neighborhood associations in housing and neighborhood revitalization, and it recommended funds for housing and revitalization projects in low - income areas. There are four possible ways to carry out the self - help programs -- neighborhood associations or organizations (NORG) which plan, coordinate, and lobby; NORG's which operate services and facilities in the neighborhood; NORG's that plan, provide services, and also own and operate residential and commercial property; and self - help efforts directed by individuals. Impacts on housing and neighborhood conditions, income and employment, population and residential assignment, and local fiscal conditions are calculated for targeted and nontargeted neighborhoods. It is concluded that the urban impacts of a self - help initiative almost surely would be positive and could be substantial if assistance were made available through some kind of neighborhood organization. The major effects felt in target areas themselves would be improvements in housing units and general neighborhood condition. Housing and neighborhoods in nontargeted areas would remain unchanged or improved, depending on the overall balance of supply and demand for housing units in the area. Impacts on income and employment would come almost entirely through job creation and would be positive although fairly modest. The designated amount of funds at $200,000 per NORG could not support more than about 75 NORG's nationally, with the result being that only about 8 to 15 cities could participate, assuming that more needy areas will require from 5 to 20 NORG's. Appendices provide supporting data, a bibliography, and a discussion of urban impact statements.

PB80-109796 MF **A01**
American Univ., Washington, DC. Center for Urban Policy.
Methods of Urban Impact. No. 3: The Program for Better Jobs and Income.
Sheldon Danziger, Robert Haveman, Eugene Smolensky, and Karl Taeuber. Jan 79, 76p HUD-0000392, HUD/PDR-365/3
Paper copy available from the Sup. of Docs., Stock number 023-000-00491-7

Urban impacts of President Carter's proposed welfare reform, the Program for Better Jobs and Income (PBJI), are analyzed. The plan would consolidate three major components of the existing welfare system -- work benefit, income support, and existing tax reductions for recipients -- and provide a nationwide minimum Federal cash payment for all the poor. It pledges public service jobs for some of those poor who are able and expected to work. Earnings, welfare, manpower policy, and taxes would be interrelated through an expanded earned income tax credit and a new, nationally uniform system of basic income support payments. The details of the program are analyzed focusing on these components: (1) job opportunities; (2) the work benefit and income support provisions for those able persons expected to work; (3) income support payments for those not expected to work (disabled persons or single parents with more than one child under 7 years); and (4) tax reductions through the earned income tax credit (tax benefits for families with earnings of $4,000 to $15,620). Results of the analysis show that PBJI would reduce income inequality somewhat among persons and among urban areas and reinforce current growth, interregional migration, and the pattern of movement of less affluent persons to the suburbs.

It would, to a small degree, distribute public service jobs in urban areas of high rather than low unemployment and provide fiscal relief to those States now making relatively high welfare payments to relatively large numbers of recipients. Further findings, tabular data, and notes are provided.

PB80-109804 MF **A01**
Department of Housing and Urban Development, Washington, DC. Office of the Assistant Secretary for Policy Development and Research.
Methods of Urban Impact Analysis. No. 4: HUD's Section 312 Program.
Norman Glickman, and Susan Jacobs. Jan 79, 54p HUD-0000393
Paper copy available from the Sup. of Docs., Stock number 023-000-00492-5

Urban and community impacts of a proposed increase in the HUD Section 312 loan program funding level for housing rehabilitation are examined. The focus of the report is on several administrative issues: direct and indirect influence of an expanded 312 program on population, employment, personal income, fiscal condition of local governments, and neighborhood conditions, effect on minority and low - income families, and interregional and intrametropolitan differentials in the program's impact. Section 312 provides direct loans for rehabilitation of owner - and renter - occupied, single - family, multifamily, and commercial structures at 3 percent annual interest for 20 years. The program operates in tandem with other HUD programs that are usually neighborhood specific, such as the community development block grant program. The impact of the proposed increase in funding -- from $85 million in 1978 to $275 million in 1979 -- is measured using regional multipliers and input - output and multiplier effect models. Results indicate that nearly 15,000 new jobs will be created nationally with 2,600 of these going to minority workers; cities will realize a $121 million increase in wages and profits, and smaller amounts will go to suburban and nonmetropolitan areas; only small effects will be realized in the population size of jurisdictions; fiscal conditions of local governments (property, sales, business, and income tax increases) will improve slightly; and housing stocks in distressed areas might improve. Long - term benefits would include increases in work experience of construction and related employees, interneighborhood migration, and neighborhood stability and pride. Two alternatives to 312, a grant program similar to 312 and a "free market" alternative eliminating the loan program, are examined but dismissed as less beneficial than 312. Tabular data and notes are provided. (Author abstract modified).

PB80-109853 PC **A07**/MF **A01**
RAND Corp., Santa Monica, CA.
Codebook for the Attitude Module of the Survey of Tenants and Homeowners, Site II, Wave 2.
Working note,
Patricia Boren. Mar 79, 145p HUD-0000496
Contract HUD-H-1789

As part of the Housing Assistance Supply Experiment, the second of a series of yearly surveys of tenants and homeowners (wave 2) was conducted in St. Joseph County, Ind. (Site II). Data were collected from January through July 1976 on household characteristics, housing expenses, mobility and housing history, occupational history and income, and knowledge of and attitudes towards the allowance program. This codebook contains information gathered from the open - ended questions on the attitude portion of the survey. Each question from the attitude module is reproduced exactly as it appeared in the survey instrument, including precoded responses. Below each question is material related to the interpretation of the responses, including new codes authorized for use in the field or during data processing, authorized changes to skip patterns, and instructions to field workers and editors. A table presents response frequencies, or marginals, for that question. These tables contain a list of all response codes appearing in the survey file at least once for that question, the number of records containing each code, and the relative frequency of the code expressed as a percentage. Final columns adjust the frequencies to permit easy calculation of medians and related distributional parameters. An introduction explains the encoding technique and the procedures which were followed during data processing. Appendices contain the instructions which were given to field workers for coding the attitude module and a list of the audit codes.

PB80-109861 PC **A04**/MF **A01**
Urban Land Inst., Washington, DC.
Private Development Process. A Guidebook for Local Government.
Allan Borut. Feb 79, 58p HUD-0000500, HUD/PDR-352/2
Contract HUD-H-2422
Prepared in cooperation with National Community Development Association, Washington, DC.

This booklet explains how private housing developers work and make investment decisions. It is designed to help local officials understand how to make their own housing strategies workable, realistic, and responsive to invididual market problems. The development process in new construction is described through a discussion of market analysis, site selection, site acquisition, planning and engineering, financing, construction, and marketing. Rehabilitation development is defined, and its unique characteristics are identified. Managing and maintaining existing housing stock, the turnover of existing stock, and factors affecting the general decline of existing stock are also considered. The private developer's role in subsidized housing programs is discussed as well. An introductory section provides an overview of the real estate industry and discusses the means of production, supply and demand, law and regulations, and decision factors as they affect the production process. A list is provided of resource materials that explore the details of housing development and housing economics. The appendix describes a Section 8 housing rehabilitation project which is a modified version of a project that is actually being developed. The purpose of this description is to offer those unfamiliar with the details of subsidized housing development a glimpse of the process that must be undertaken by the developer to achieve financing.

PB80-109879 PC **A05**/MF **A01**
Berkeley Planning Associates, CA.
Multifamily Failures. Volume 1. A Quantitative Analysis of Financial Failure in Multifamily Projects: A Disaggregated Comparative Analysis.
Evaluation rept.,
Michael B. Teitz, and Richard Dodson. Jul 75, 97p HUD-0000560
Contract HUD-H-2148

Two earlier reports presented preliminary results of a multivariate analysis of financial failure in a national sample of 618 multifamily subsidized housing projects and the findings of a series of case studies of a small number of both failing and nonfailing projects. This report aims to bridge the gap between the national sample analysis and the cases by disaggregating the national data and examining failure behavior at the regional level and also by forms of sponsorship. A brief reconsideration of the logic underlying the organization of explanatory variables is provided to establish the basis for grouping the variables used in the multivariate analysis. Summary statistics are also examined on failure and other project variables across regions and sponsorship types. Finally, simple correlations between alternative definitions of failure and the possible explanatory variables are examined in relation to several hypotheses about the failure process. Overall, locational variables (i.e., urban core, nonurban core) exhibit substantial consistency and mixed levels of association with failure. Neighborhood physical and safety factors also appear correlated. Broader locational indicators and market conditions, as measured by the sample data, are only modestly related to failure. Although project social characteristics correlated strongly with failure, project physical characteristics did not, a disappointment in light of the variety of hypotheses linking physical design to project performance. Certain tenant characteristics, such as the percentage of elderly residents, correlated with failure, as did a project's nonprofit as opposed to profit - oriented sponsorship. However, some of the highest correlations occurred among the management variables: experience, as indicated by management of more than one project, was consistently negatively correlated with failure, as was continuity of management since occupancy for nonprofit projects. Tabular data are included.

PB80-109895 PC **A10**/MF **A01**
Urban Inst., Washington, DC.
Improving the Productivity of Purchased Care.
Thomas J. Walsh, Fred Teitlebaum, and Mark Testa. 31 Jan 79, 202p HUD-0000634
Grant HUD-H-2578RG
Prepared in cooperation with Illinois Planning Consortium for Children's Services, Springfield.

To evaluate the outcomes of care services purchased by the Illinois State government, researchers conducted this study by first synthesizing treatment goals and then observing whether goals are met for a large number of cases. The field of service chosen for this pilot project was child care in institutional settings including services delivered to children with behavioral problems who are placed in institutions or group homes as an alternative to placement at home or in a foster home. Permanence and continuity were chosen as the measures of success, and the group care agencies reviewed were classified according to scope of services, intensity of resources, and size. To identify those factors which contributed to achievement of care goals, researchers used a sample of 600 children who entered institutions for the first time in 1974. The case records of these children were reviewed to obtain description of their behavior and the reasons for institutionalization, a history of the children and their families, and a record of all placements and significant events during placement. Financial records of the institutions were also surveyed. Overall, less than half of 3,200 placements resulted in continuous outcomes, and only 60 percent of the children studied achieved a stable, noninstitutional living environment. For a large proportion of the children, then, the care system failed despite an average expenditure of $9,000 per year per child. Specific study findings, implications, study support data, and the survey instrument are included.

PB80-109952 PC **A05**/MF **A01**
RAND Corp., Santa Monica, CA.
Selecting the Permanent Panel of Residential Properties: Site I. Housing Assistance Supply Experiment.
Working note,
Timothy M. Corcoran. Apr 78, 96p HUD-0000781
Contract HUD-H-1789

Prepared as part of the Supply Experiment of the HUD Experimental Housing Allowance Program, this report documents the selection process for a permanent panel of residential properties to be annually surveyed in Brown County, Wis. The Supply Experiment is designed to test the market and community response to a full - scale housing allowance program and to measure mobility patterns of the recipient families. Sample selection worked forward from a sampling frame of all 61,791 tax parcels in Brown County. A baseline sample of 5,039 properties was selected in three phases, each entailing data collection, stratification, and subsampling. A fourth phase yielded the permanent panel of 1,945 properties. Both the sample design and the first three phases of the sample selection are reviewed, along with the baseline field work that began the fourth phase of sample selection. The following section explains how field reports from several surveys and field office records were abstracted and audited to form a comprehensive, internally consistent file of property records containing all the information needed for the panel selection. Subsequent passages explain how the baseline sample was restratified and corrected to reflect information obtained in the baseline surveys, how each residential property recorded was tested for completeness, and how each residential stratum was sampled to form the permanent panel. Additional file documentation, definitions, and statistics are appended. A glossary and bibliography are also included.

SHR-0002220 PC **A06**/MF **A01**
Illinois Dept. on Aging, Springfield.
Plan for Services for the Aging: Fiscal Years 1978 - 1980. Illinois Human Services Plan, Volume 6.
Jul 77, 112p

See also Volume 1, SHR-0002098; Volumes 2 - 5, SHR-0002216 -- SHR-0002219; Volumes 7 - 13, SHR-0002221 -- SHR-0002227 and related document, SHR-0002228.

The Illinois Department on Aging (DOA) was created in August 1973 to develop a comprehensive and coordinated system of services for the State's 1.636 million older persons, 60 years of age or older. Services to the elderly include homemaker, chore and housekeeping, housing assistance, counseling, transportation, legal services, home - health, education, escort, outreach, nutrition, and day care. The goal is to help older people function in their homes and communities and remain out of institutions. The plan for fiscal years 1978 through 1980 involves funding 275 local programs for 300,000 older people. The DOA will expand its advocacy programs and is developing a network of legal services for the elderly. It will continue to work with other agencies and will design and implement an information system to comply with stringent Federal reporting requirements. Emphasis will be placed on increasing participation in nutrition programs with congregate meal sites in more than 350 locations. Three comprehensive alternative care centers will be established at an estimated cost of $777,300 to house an array of services including adult day care, homemaker, housekeeping, and health screening. The DOA will initiate additional day care services to assist older persons who desire to remain at home but are in need of supportive services. The DOA plans to reorganize and place greater emphasis on statewide planning and program effectiveness including closer involvement with the 13 area agencies on aging. Expenditures for the department's services are expected to increase by about 135 percent between 1977 and 1980, and the number of service recipients is expected to increase by 53 percent. The DOA administers funds under Titles III and VII of the Older Americans' Act and Title XX of the Social Security Act. Numerous tables are included, and an appendix contains an index of pertinent statutes and regulations.

SHR-0002520 PC **A07**/MF **A01**
Sonoma County Human Services Task Force, Santa Rosa, CA.
Sonoma County Human Services Task Force Report to the Sonoma County Board of Supervisors.
Final rept.
Apr 78, 135p

Funding, planning, and delivery aspects of human services in Sonoma County, Calif., are addressed. A human service task force was established in 1976 and subsequently adopted five objectives: to define components of the human service system; to identify and examine issues and problems in and providers of human services; to analyze information gathered under the second objective; to determine whether improvement is needed in the human service system and, if so, to develop a model for implementing improvement; and to prepare and submit a final report for action. Service categories explored by the task force were community care and residential and protective services, developmental disabilities services, emergency services, employment development and training, family planning, financial aid, health, housing, mental health, recreation, school services, and substance abuse - drug services and alcohol services. A group of 125 persons was selected for interviewing from a list of over 300 agencies, groups, and individuals in the county. Most problems that occurred in the delivery of human services were directly attributable to a lack of a rational human service system. To overcome these problems, the task force recommends that a human services commission be established and that a 3 - year process for the development of a comprehensive public - private human service system be initiated. Historical events in the provision of human services to county residents are reviewed. Additional information on the task force conclusions and recommendations is contained in appendices.

SHR-0002525 PC **A04**/MF **A01**
Central Wisconsin Center for the Developmentally Disabled, Madison.
Public Residential Services for the Mentally Retarded, 1976.
R. C. Scheerenberger. 1976, 61p
See also supplement, SHR-0002526.

Public residential facilities for the mentally retarded were surveyed with respect to basic demographic data on the population served, population movement, placement - postplacement procedures and services, resident programs, parental participation, and administration (including budgeting and staffing). Information was obtained through the use of a 33 - item questionnaire. Additionally, a short - form questionnaire was employed that contained seven items dealing with rated bed capacity and total number of residents, date a facility accepted its first resident, population according to sex, level of retardation, chronological age, average daily population over a 5 - year period, and budgetary information. As of June 1976, there were 239 public residential facilities sponsored and administered by States that offered comprehensive programming on a 24 - hour weekly basis. All facilities participated in the survey. Of the 239 facilities, 2 had not attained operational status at the time of the survey; of the remaining 237 facilities, 167 completed the long questionnaire and 70 used the short form. The total rated bed capacity for fiscal year 1975 - 1976 was 165,710. The average daily resident population was 153,584, with approximately 36 percent being of school age and 58 percent adults under 62 years of age. About 75 percent of all residents were profoundly and severely retarded; the remaining 25 percent were moderately or less retarded. The new admission rate, excluding respite care, was 5.1 percent of the total resident population of 110,854, as reported by the 167 facilities. Most of these new admissions were on a voluntary basis. The majority of facilities depended on some type of interdisciplinary approach to screening and reviewing residents for community placement. Of facilities responding to the item about parental objection and followup, 11 percent reported no parental objections and 89 percent indicated some level of objection. An individualized program plan was written for each resident in 149 of the 167 facilities. A substantial number of residents were involved in formal education or training programs, language and speech therapy, behavior management, work activities or sheltered workshop experiences, and special self - care and ambulation programs. Parents were extensively involved in numerous residential activities. The total estimated budget for operating the 237 facilties was slightly over $2 billion, excluding construction costs. Of this figure, 79.7 percent went for salaries. Per diem costs ranged from $15 to $160, with a mean of $35. Supporting data and references are included.

SHR-0002526 PC **A04**/MF **A01**
Wisconsin Dept. of Health and Social Services, Madison. Central Wisconsin Center for the Developmentally Disabled, Madison.
Public Residential Services for the Mentally Retarded, 1976. Supplement. Basic Data: U.S., Federal Regions, and States.
R. C. Scheerenberger. 1976, 66p
See also main document, SHR-0002525.

Supplementary data are contained in this companion volume to a report on public residential facilities for the mentally retarded in the United States. Responses were received from all 237 facilities surveyed. Long - form questionnaires were completed by 167 facilities and short - form questionnaires were used by 70 facilities. The total number of residents as of June 1976 in all facilities was 154,856. The rated bed capacity was 165,710 for an occupancy rate of 92.7 percent. Percentages of male and female residents were 54 and 46, respectively. The majority of residents were severely or profoundly retarded, and most were between 22 and 61 years of age. The total budget for all facilities for fiscal year 1975 - 1976 was slightly over $2 billion. Personnel costs represented approximately 80 percent of this figure. The average per diem cost for residents was $35. Detailed data are provided for facilities in the 10 DHEW regions and by State.

SHR-0002609 PC **A10**/MF **A01**
Milwaukee County Office of the Executive, WI. Harambee Human Services Task Force.
Harambee: A Proposed Model for a Neighborhood Human Services System.
Frederick R. Birts, and Linda A. Sunde. Sep 77, 204p

Findings are presented for the needs assessment and model development phases of Milwaukee, Wisconsin's Harambee Human Services Project. The needs assessment phase consisted of resident interviews, service agency inventories, a literature review, and census data collection in the Harambee community, an urban residential tract along the Milwaukee River between Capitol Drive and North Avenue. These data were then used to develop a model for a neighborhood human services system relevant to the Harambee community and simultaneously respectful of cost restraints and the interest and capabilities of existing service delivery systems. Among the critical problems revealed by the needs assessment were unemployment, crime, housing, youth unemployment, and problems of the elderly. The proposed Harambee Human Services System calls for improved responsiveness to individual and community needs, increased accessibility to services, better coordination of human services in and around the community, and more effective and efficient service delivery. The model system proposes to meet these goals through a coordinated countywide human service system which uses neighborhood involvement in helping facilitate service delivery for local residents, overseeing service provision at the neighborhood level, and making recommendations to local funding bodies on needed changes in the existing service delivery mechanism. The development and implementation of specific elements of the proposed system model are outlined. Tabular and appended summary data are provided.

SHR-0002645 PC **A99**/MF **A01**
Pacific Northwest Regional Commission, Vancouver, WA.
Flexible Intergovernmental Grant Project: A Demonstration Proposal and Evaluation Design for Grant Consolidations in the States of the Pacific Northwest.
Stephen D. Mittenthal, Robert B. Muse, and Robert L. Newhart. Apr 78, 1110p
Executive Summary available from PROJECT SHARE, P.O. Box 2309, Rockville, Md. 20852 as SHR-0002645/ES.

This document is a proposal to implement the second phase of the Flexible Intergovernmental Grant project (FIG), a demonstration and evaluation project. FIG is a human resources project funded by HEW to plan, design, and implement a major test of Federal cross - program flexibility, and to evaluate the resultant effects on human resource systems and their beneficiaries. The three States involved -- Idaho, Oregon, and Washington -- each selected a priority area around which they have designed demonstration projects. Each project involves the combination of discrete but functionally related categorical grant - in - aid programs into a single grant or program package that provides complementary resources to a defined population. The aim of the consolidated grant is to simplify and rationalize the funding, administration, and accountability of human resources in the priority area selected. The introductory section of the proposal provides an overview of the purpose, scope, background, procedure, and concept underlying the total project. Next, an overall conceptual framework is provided of the project, with attention to the assumptions and objectives of the project approach, the evaluation design, and the desired Federal response. The three State demonstration proposals follow. The Idaho and Oregon proposals deal with maternal and child health / social services and long - term care for the elderly, while Washington's is concerned with major manpower resources. The closing chapters detail the evaluation work plan and proposed activities, describe staffing requirements for the evaluation, and present the proposed evaluation budget for the first demonstration year. Tabular data and references are provided throughout.

SHR-0002763 PC **A04**/MF **A01**
National Center for Voluntary Action, Washington, DC.
Older Volunteer.
Judith Towner Williamson, and Margaret Johnson Ware. Jul 77, 52p
Grant ACTION-137-0081/3

Various programs that use and benefit from services of older volunteers are described as well as the program objectives, nature of the volunteer

work, and nature of the target group. Older Americans can share years of valuable knowledge working as volunteers, continue to experience the satisfaction of knowing that they are needed and have opportunities for social contact. Volunteering can be a natural, progressive step for some older persons, particularly those experienced in volunteering, but a new and intimidating practice for others. Coordinators of programs involving older volunteers, therefore, stress the importance of training, supervision, reassuring volunteers, and recognizing the value of their service. The programs listed in this publication cover a range of activities from working in nursing homes with the elderly to crime prevention, oral history, and paralegal services. Some of the programs listed are as follows: Citizens for Better Care of Detroit, Mich. (advocates for the improvement of care in nursing homes, homes for the aged, and other after - care facilities); Legal Counsel for the Elderly in Washington, D.C. (involves volunteers in the delivery of legal assistance related to public benefits programs); Tax - Aide (a nationwide program providing free income tax counseling to older persons); Senior Exchange Service in San Diego, Calif. (encourages the exchange of talents among senior citizens); and Service Corps of Retired Executives (a nationwide program aiding small businesses and community organizations with management and operating problems). The appendices contain the program addresses and names of contact persons, the resource groups, and a list of publications dealing with older volunteers.

SHR-0002764 PC **A04**/MF **A01**
National Center for Voluntary Action, Washington, DC.
Volunteer Services for Older Persons.
Judith Towner Williamson, and Margaret Johnson Ware. Jul 77, 55p
Grant ACTION 137-0081/3

An overview is provided of what selected volunteer services around the nation are doing to assist older persons in coping with the physical, emotional, and financial aspects of aging. A nationwide program providing income tax assistance to low - income, elderly, and non - English - speaking taxpayers is discussed, along with local initiatives in New York, Michigan, New Mexico, Oregon, California, Pennsylvania, Missouri, Virginia, Minnesota, Illinois, Maryland, Texas, and Massachusetts. These initiatives lead political advocacy on behalf of older persons, befriend elderly alcoholics, furnish housing that senior citizens can afford, offer outlets for their baked goods and crafts, provide them with job opportunities and employment counseling, make library materials available to the homebound elderly, encourage store discounts for elderly customers, assist disabled senior adults and their families through daily care and activities, provide consumer and health care information relevant to older persons, act as advocates for elderly victims of crime, and provide companionship and services that enable older citizens to stay in their homes. In addition to short synopses of each program, program addresses, telephone numbers, and contact persons are also listed.

SHR-0002774 PC **A03**/MF **A01**
Citizens' Committee for Children of New York, Inc., NY.
Social Services: Short Shrift for 600,000 Children on AFDC (Aid to Families with Dependent Children).
Apr 78, 45p

Public assistance methods for identifying social service needs and providing social services for aid to families with dependent children (AFDC) program recipients were examined in 1977. Monitoring took place at income maintenance and recertification centers in New York City that handle eligibility and financial assistance. Monitoring also occurred at the Office of Case Intake and Management (OCIM) within the city's Department of Social Services. The number of children on AFDC ranged from 10,000 to 34,000 at 6 of 38 income maintenance centers covered by the study. In order of importance, services most frequently requested by AFDC applicants related to housing, jobs, medical and psychiatric care, stretching money, day and child care, family planning, problems with child, and problems with husband. Center directors generally agreed that little time was spent on personal or family problems beyond what was necessary to establish eligibility for AFDC. These problems involved pregnant adolescents, housing, money management, lack of clothing, truancy or leaving school, mental health problems, marital problems, managing children, babysitting fees, and adolescent mother wanting own apartment. Services requested most freqently by families and children at the OCIM were related to child care, help in family relationships, help in housing, school attendance / truancy, home and money management, separate housing for adolescent mothers, home care, health - related services, transportation, protective services, and client advocacy at income maintenance centers. Even though linkages, referral, and case management were important elements in the OCIM, the office reached only a small number of families and provided a limited range of services for children and their families. A survey of social service agencies in the field indicated that most had a substantial number of AFDC recipients in their caseloads. The operation of and services provided by income maintenance and recertification centers and the OCIM are detailed. Recommendations to enhance services rendered to AFDC families are offered.

SHR-0002787 PC **A03**/MF **A01**
Massachusetts League of Cities and Towns, Boston. Local Officials Human Services Council.
Municipals' Influence in State Social Policy. The Role of Area Strategy.
Barbara Thornton. 30 Jun 78, 40p

The Massachusetts area strategy planning teams (ASPT), a concerted effort by six State agencies to cooperate in planning for, developing, and implementing human services, is described with emphasis on ways to integrate ASPT with local government. The year 1977 to 1978 was the first period of operation for the ASPT, which is composed of nearly 40 teams made up of representatives from the Department of Mental Health, the Department of Public Welfare, the Department Office for Children, the Massachusetts Rehabilitation Commission, the Commission for the Blind, and the Division of Special Education of the Department of Education. However, there was little awareness among local government officials that the ASPT existed. It is recommended that the ASPT should ask the municipality to designate a formal contact person for receiving and communicating information to the team in its area of interest, invite local participation in the ASPT when the teams are ready, cultivate a day to day working relationship with appropriate local professional staffs regarding issues of planning and management of human services, and recognize certain protocols for formally communicating with local governments. The State should adopt a policy which recognizes the special status, authority, and responsibility of local general purpose government for human services and area strategy and extend the goal of the area strategy effort to develop an intergovernmental partnership between State and local government. Municipalities should develop an internal capacity for managing, monitoring, and advising chief officials on human services and an intermunicipal network for the purpose of discussing human services issues. A description of a proposed local government human services office is provided as well as an outline for linking municipalities and area strategy. Specific recommendations for local and State government and background on State - local issues are provided.

SHR-0002800 PC **A06**/MF **A01**
Vanderbilt Univ., Nashville, TN. Center for Advanced Study and Continuing Education in Mental Health.
Foster Parent Training Project.
Final rept.
Arthur J. Robins, Richard L. Blanton, and Maureen Hart. Aug 75, 123p
Grant SRS-47-20482

This final report on a Tennessee Department of Human Services project to train foster parents in child care describes the background of the project, project planning and implementation, and the curriculum developed for the project. Potential project trainees were selected from State registries of foster parents and surveyed their education levels, occupations, length of experience as foster parents, previous training programs, etc. The typical parents were in their middle to late forties and had completed from the 7th to the 10th grades in school. They had 6 years of experience as foster parents, had cared for eight children, but had had no previous training. Three major components were identified as needed curriculum content for these parents: organization and administrative topics, child development, and child management. The training was scheduled around two 2 - day units and sessions were devoted to defining foster care, identifying characteristics of children for whom foster family care is appropriate, discussing types of homes and services to parents and children, defining foster parenting as a profession, considering child welfare as a field of welfare, and examining the American legal system regarding juvenile courts, foster child marriages, adoption, school law, and liability. A curriculum outline is presented describing the objectives of each session, specific discussion topics and activities, material presentation methods, and books and references necessary to conducting the sessions. The appendices contain training materials, a sample evaluation form for the project, and discussions and recommendations for the project.

SHR-0002821 PC **A05**/MF **A01**
San Francisco State Univ., CA. Dept. of Social Work Education.
Family Day Care Project.
Final rept.
Martha Roditti, and Patricia Siegel. Mar 76, 89p
Grant SRS-47-45394

This report documents the developmental phases of a 1 year project designed to initiate and provide needed support and training to family day care providers in San Francisco, Calif., and to establish a network of communication among providers. The seven - cycle training program (which included a training cycle taught both in Spanish and in Chinese) consisted of courses and workshops in child care, first aid, creative play, and business management. Community teachers, doctors, psychologists, and other professionals were recruited to help teach single - session courses and to give lectures to the 189 participants. Success of the family day care project depended partly on its ability to interact with the Department of Social Services, but the low priority awarded family day care within the department and the tension that has existed historically between the department and the Childcare Switchboard, a sponsoring agency of the project, interfered with this cooperation. Descriptions of the training cycles conducted in seven socially and racially divergent communities are presented, as well as specific program topics and participant recruiting procedures.

SHR-0002867 PC **A03**/MF **A01**
National Center for Voluntary Action, Washington, DC.
Community Needs and Resources Assessment Guidebook.
Kate W. Jackson. Jul 76, 37p
Grant ACTION-137-0071

Guidelines to assist in service planning that is coincident with service needs through community needs and resource assessment (CNRA) are presented. The CNRA process is dependent on the nature, size, and complexity of a community. Eight principles should guide CNRA: goals are for all people; community leaders should launch and guide a program; wide citizen participation is essential; conclusions should be reached by consensus; representative citizen groups should prepare proposals; a program is nonpartisan, nonpolitical, and independent; a program is a facilitating but not an implementing activity; and a program is a long - term endeavor. The role of a voluntary action center in CNRA varies according to a community; duplication in assessment may be avoided if this center's files are considered as a starting point in the CNRA process. Primary tasks in organizing a CNRA study are research into existing information and data, the design of survey questionnaires, survey financing, the selection of a random sample of the population, the recruitment and training of volunteers, the collection and analysis of data, and the determination of policies and work plans. Possible service categories to be incorporated in the assessment of community resources are public facilities and services, transportation, education, health and welfare, recreation, information and re-

ferral, and environmental. Recommendations resulting from assessment must relate to such elements as goal setting, planning, coordination, staffing and organization, client information / education, conferences and technical assistance, and evaluation. Procedures for assessing needs and resources and for interviewing are detailed, and necessary forms are included. A CNRA checklist is also included.

SHR-0002869 PC **A12**/MF **A01**
American Institutes for Research, Washington, DC.
UDIS: Deinstitutionalizing the Chronic Juvenile Offender.
Charles A. Murray, Doug Thomson, and Cindy B. Israel. Jan 78, 265p
Executive Summary available from PROJECT SHARE, P.O. Box 2309, Rockville, Md. 20852 as SHR-0002869/ES.

The Unified Delinquency Intervention Services (UDIS) program in Cook County, Ill., is described. The program has been operational since 1974 as a demonstration effort designed to serve two primary functions: (1) to take as its clients juveniles in trouble who would otherwise be sent to a State correctional institution for youth and (2) to unify resources aimed at deinstitutionalizing chronic juvenile offenders. Three basic principles guiding UDIS concern the least drastic alternative, the goal of getting youth out of the juvenile justice system in an expedient manner, and individualized programming. Service resources are devoted to advocacy, counseling, educational and vocational training, group homes or foster care, rural programs, and intensive care. A total of interviews were conducted with seven groups of respondents: UDIS case managers and administrative staff, service providers on contract to the UDIS program, county probation officers, county juvenile court justices and administrative staff, agency officials, persons responsible for the design and implementation of UDIS, and youth. Data files used separately and in combination during the UDIS evaluation included police contact data, program histories, and case histories. These files were keyed to three samples: UDIS referrals between October 10, 1974, and July 1, 1978, boys committed to the Illinois Department of Corrections (DOC) during the same 21 months, and boys committed to the DOC during the 21 months immediately preceding the establishment of UDIS. The impact of UDIS was assessed in terms of recidivism, the suppression of delinquent activities, and relative costs of UDIS and the DOC. Both UDIS and the DOC achieved large reductions in indicators of recidivism. With postintervention policy records of combined UDIS and DOC samples compared to police records during the year preceding intervention with respect to incidents per person - month, it was found that arrests dropped by 67.8 percent, court appearances dropped by 64.4 percent, violence - related offenses dropped by 73.7 percent, and aggregate serious costs of offenses to the community dropped by 65.2 percent. On a monthly basis, the DOC was estimated to be 4.8 percent less expensive than UDIC. Over a typical program cycle, however, UDIC was 7 percent less expensive than the DOC because it held its clients for a shorter period of time. Appendices contain the data collection instruments used to evaluate the UDIS program, references, and sample outputs of a computerized tracking system to monitor UDIS. Supporting tables and figures are included throughout the report.

SHR-0002905 PC **A07**/MF **A01**
Center for Systems and Program Development, Inc., Washington, DC.
Policy Issues in Day Care: Summaries of 21 Papers.
28 Nov 77, 143p
Contract DHEW-100-77-0017

The summaries in this collection were written by recognized experts in the fields of day care and child development. The author's tasks were to review and synthesize the relevant day care literature, identify critical issues to be addressed in organizing the literature, and present a set of recommendations bearing on day care policy and regulations. The papers are based on research data, program experiences, and personal observation. They address the following subjects: (1) the history of the Federal Interagency Day Care Requirements; (2) the role of governments in establishing and regulating day care and the administration of day care standards; (3) the effect of day care on children, families, caregivers, and communities with regard to age - specific groups of children (infants and toddlers, preschoolers, and school age children), the effects of the physical environment (special design and organization and health and safety needs), staffing patterns, and parent participation; and (4) day care and the marketplace. The summaries are intended to help citizens and policymakers identify those papers that will illuminate day care issues of concern to them but are not intended to replace the paper themselves. It is hoped that the papers will enhance public debate on social policy and the proper Federal role in regulating day care.

SHR-0002923 PC **A03**/MF **A01**
National Center for Voluntary Action, Washington, DC.
Self-Evaluation Handbook for Voluntary Action Centers.
Kate Jackson. Feb 76, 43p
Grant ACTION-137-0060

The National Center for Voluntary Action guide to self - evaluation of Voluntary Action Centers (VAC's) contains a general discussion of evaluation, reasons for conducting self - evaluation, and an explanation of how evaluation can serve as a useful staff tool. Evaluation is a means of determining if programs are reaching their objectives or moving in the right direction, fulfilling their purposes, operating efficiently and effectively, or suffering from constraints, and if so, identifying the constraints. Self - evaluation should help with both short - and long - range planning. Action center personnel will need to identify goals and objectives, develop a list of operational term definitions, describe and define programs and areas of interaction among programs, list inputs and outputs, and apply quantitative, qualitative, or indirect measurements of progress. Several models for self - evaluation are presented including before and after comparisons, planned versus actual performance, and comparison with ideal standards. Selection of an appropriate model should be based on feasibility, utility, and cost. An evaluation and planning process is outlined consisting of these segments: goals and objectives, operational definitions, programming, measures, data, work plan construction, task definition, and resource allocation. Data sources can be minutes of meetings, work plans, budgets and bookkeeping records, statistics, timekeeping records, and reports. Self - evaluation requires participation of staff, volunteers, and interested professionals. VAC standards of performance and an evaluation checklist are provided.

SHR-0002931 PC **A03**/MF **A01**
New York City Advisory Board to the Dept. of Mental Health, Mental Retardation and Alcoholism Services. Urban Crisis Committee.
Reviving a Sense of Community. A Report of the Citywide Urban Crisis Committee.
29 Mar 78, 28p

Employment opportunities, urban family policies and support for effective family functioning, and restrictions imposed by racial discrimination are covered in this report on unity in urban communities. The most urgent problem faced by cities is unemployment, and this problem is directly related to community stability and to the mental health of individuals and communities. A multifaceted approach to increasing job opportunities for youth and their parents and effective on - the - job training programs that provide basic skills are needed. Motivation and attitude are as important as training in the retention of jobs. Social supports, incentives to develop potential, and opportunities to participate in communal activities are necessary for apathetic persons who are unemployed. The employment thrust also needs to focus on efforts that will improve the educational process in schools so youth can develop interpersonal skills required to live in a complex urban society. The urban family, regardless of differences in structure, class, geography, and ethnic identity, is the primary and potentially the most efficient support system in communities. Social and economic problems should be addressed simultaneously in order for the family to survive and contribute to constructive social interaction and stability. There is an important connection between employment and family stability, and employment and public assistance programs should be coordinated with family support programs. If communities are divided by income and class, more racial discrimination will occur. Ethnic or minority groups are politically weak and often fail to utilize the advantage of community coalitions that can serve to unite them. Recommendations on community stability, specifically for New York City, are offered. Persons who contributed to the report's preparation are listed.

SHR-0002933 PC **A05**/MF **A01**
Regional Inst. of Social Welfare Research, Inc., Athens, GA.
Case Management for Children's Protective Services.
Daniel G. Boserup. Feb 78, 76p

Concept, process, and implementation requirements are covered in this manual dealing with the Case Management for Children's Protective Services (CMCPS) system in Georgia. Factors that influence all public programs and demonstrate the need for an effective CMCPS system are (1) inherent deficiencies, e.g., stress resulting from centralized or decentralized program administration and service provision; (2) program policies, rules and regulations that result from compromise; (3) problems related to insufficient funds to retain needed personnel and provide adequate inservice training; (4) professional and bureaucratic self - interests; and (5) difficulties in evaluation design and implementation. Specific problems inherent in children's protective services concern the timeliness of response to reports and requests, the provision of appropriate services, the elapsed time between case investigation and action and between diagnosis and treatment, the documentation of outcomes, community involvement and values, the utilization of community - based expertise, and communication and case coordination with collateral systems (courts, law enforcement, hospitals, and schools). Practical limits of organizational effectiveness are recognized in the case management model and basic requirements of a general design to be followed by case workers are specified: (1) connect case problems with proper service and treatment resources; (2) adopt a goal - setting time - limited approach to case evaluation, planning, and action; (3) recognize limits of service availability and expertise; (4) locate and use other professional services; (5) assure community involvement and service access; (6) identify, communicate, and integrate decisionmaking with other case participants; (7) assure case responsibility and related assignments; (8) organize work and responsibility for investigation or intervention and for treatment or service and case handling; and (9) promote oversight and follow - through on cases. The case management process involves decisions, procedures, activities, knowledge about such areas as child abuse and neglect, policies, regulations, and administrative directives. Features of the CMCPS system are evaluation, case planning, service arrangement and provision, overseeing, and recording. The system represents a set of process standards against which practices and procedures, or the lack thereof, can be measured and an ideal which can be approximated. Appendices contain a process outline of the CMCPS system and associated case management diagram.

SHR-0003022 PC **A02**/MF **A01**
Boston Coll., Chestnut Hill, MA. Graduate School of Social Work.
National Social Services Definition Project. Information System Design.
Preliminary rept.
Apr 78, 19p
Grant SRS-84-90406
See also related documents, SHR-0003024 - SHR-0003026.

A description is provided of a six - level information system designed to process complex qualitative and quantitative data elicited from the States concerning the relationship between State Title XX services as provided and the taxonomy of social services suggested by the National Social Services Definition Project. The system is intended to process data for which the relationships and inter-

relationships of interest are of primarily a qualitative nature, e.g., the relationships between social service taxonomies across and between States. A flow chart outlines the various levels of processing from raw input through the production of final reports. Data which are primarily static, infrequently introduced and not updated, enter the files at Level I. At Level II locations, data are introduced on a continuous basis, either as they originally become available or as they are updated. Level III locations are positions in the system where input data are checked and restructured for entrance into the storage files. At Level IV, five direct access system service files are provided, four to contain lists or tables of qualitative descriptors and one to contain interview data obtained from Title XX planners. Level V is the point at which the data are entered into a series of programs written to produce Title XX reports, including State profiles, national summary data reports, and selected detail reports for each project category. The Title XX report series itself is produced at the final level, corresponding to the programs developed at the preceding level. Sample file printouts are appended.

SHR-0003024 PC **A02**/MF **A01**
Boston Coll., Chestnut Hill, MA. Graduate School of Social Work.
Types of Social Services Planning: An Analysis of Planning in Title XX Agencies. A Report of the Social Services Planning Studies Title XX Planning Project.
Edmund M. Burke, and Victor A. Capoccia. 1978, 21p
Grant SRS-84-90406
See also related documents, SHR-0003022; SHR-0003025; SHR-0003026.

This three - phase study conducted in 1977 of Title XX planning explains the type of planning styles used by public social services agencies in the preparation of a State's comprehensive annual services plan (CASP). The first and second phases consisted of an analysis of Title XX planning documents for 1976 - 1977 and case studies of six States. The final phase involved the presentation of the analysis and case study findings to Title XX planners at four regional meetings. As a consequence of the study, five types of planning were identified: rational / comprehensive, strategic, remedial, allocative, and issue - focused. Within the allocative type of planning, four variations were noted: linear programming, performance budget planning, process budget planning, and system budget planning. The allocative model of planning was found to be the dominant approach practiced by Title XX agencies. The environmental characteristics within which Title XX operates, as well as the orientation of Title XX administrators, appear to determine this type of planning strategy. Rather than concentrating on developing comprehensive planning documents, it would be more appropriate to improve the procedures and practices of allocative planning. However, strategic planning would be a more appropriate type of planning for achieving the goals and mission of the Title XX agency; it is an effective management tool and would appear to be a more promising technique than comprehensive planning for developing innovative and unique social service programs. References are footnoted.

SHR-0003025 PC **A02**/MF **A01**
Boston Coll., Chestnut Hill, MA. Graduate School of Social Work.
Title XX Information Processing System. A Report of the Social Services Planning Studies, National Social Services Definition Project.
1978, 11p
Grant SRS-84-90406
See also related documents, SHR-0003022; SHR-0003024; SHR-0003026.

A report is provided on the status of an information system designed to process complex qualitative and quantitative data obtained from States concerning the relationship between Title XX services as provided and the definitions of services suggested by the National Social Services Definition Project. The six - level system receives, codes, and files both infrequent and continuous data and eventually generates a report series which includes State profiles, national summmary data reports, and selected detail reports for specific project categories. In a test of the system, six States were chosen at random to serve as sample data for program development; two main programs were written to generate reports. The reports to be produced by the system have several purposes. Some are to provide a mechanism by which information can be disseminated among the States on the Title XX services being provided, and some are to provide analyses documenting the status quo in certain details, such as the average number of services provided, available budgetary data, and the approximate numbers of clients served annually. These goals were realized or are realizable to varying degrees. The State profiles and data summary outputs demonstrated the relative ease with which a straightforward listing of data may be obtained. Detail reports on the pattern of relationships among services were not carried to full development when it became apparent that certain data limitations would result in poor information return. The central limitation -- coding problems -- relates to a lack of correspondence in the 'meaning' of codes. Other difficulties encountered in data management procedures relate primarily to the highly qualitative and associative data with which these programs deal. A system flow chart is included.

SHR-0003026 PC **A08**/MF **A01**
Boston Coll., Chestnut Hill, MA. Graduate School of Social Work.
National Social Services Definition Project. Data Summary.
Second draft rept.
May 78, 155p
Grant SRS-84-90406
See also related documents, SHR-0003022; SHR-0003024; SHR-0003025.

This second interim report of the National Social Services Definition Project conducted by the Boston College Graduate School of Social Work provides State Title XX planners and project interviewers from local United Ways with an opportunity to verify and comment on information reported in the interview guide. The report is organized to state issues involved in establishing a common framework in which to examine individual State's service definitions, and to encourage maximum feedback and direction from States in resolving definitional issues. Following introductory material, a national overview presents a discussion of each service area in the definitional framework used by Boston College and the collective response of States to each service area based on the interview guide. Then the basic feasibility of the system developed by Boston College is established, and services in the Boston College framework that should be omitted are identified, along with services that should be added. Finally, data from all the 48 States that completed the interview guide are summarized, both generally and by individual State; data on unique services offered by each State are included.

SHR-0003129 PC **A03**/MF **A01**
Minnesota State Planning Agency, St. Paul. Human Resources Planning Unit.
Human Services: A Guide to County Planning and Decision Making. A Reference for Human Services Administrators and Planners.
Elaine Timmer. Jan 79, 35p

This reference guide for human service administrators and planners, the second of two documents designed to help Minnesota's county commissioners and planners assess the need for and implement planning programs, describes both simple and complex planning techniques. Data collection is basic to planning, and the ongoing data collection discussed here can provide necessary information on the past and present status of human services, the status and characteristics of the county's population, and changes and trends in populations, human needs, and county revenues. Planners should conduct a resource inventory and an assessment of human services available in the county (forms and data needs for an inventory are provided). Mail, telephone, and person - to - person interviewing methods are outlined for planners wishing to obtain data on issues such as citizens' perceptions of human services effectiveness and potential demands for new services. Steps for developing service goals, guidelines, objectives, and standards are presented around these topics: service availability and accessibility, quality of care, and efficiency and economy of services. For establishing county human service priorities, three common techniques of selection are explained: the nominal group process, the Delphi process, and simple ranking. The final chapter deals with formal presentation of plans to the board of county commissioners and to the citizens, county budget preparation, plan review and approval, implementation, and evaluation of planning processes and products. Appendices contain a sample table of contents for a county plan, a listing of sources for statistical planning data and basic social indicators, and information on how to display data. Figures and charts and a bibliography are provided.

SHR-0003153 PC **A04**/MF **A01**
Denver Research Inst., CO. Social Systems Research and Evaluation Div.
Illusion of Deinstitutionalization.
Joseph Halpern, Paul R. Binner, Cynthia B. Mohr, and Karen L. Sackett. Oct 78, 74p
Contract DHEW-100-77-0107
Executive Summary available from PROJECT SHARE, P.O. Box 2309, Rockville, Md. 20852 as SHR-0003153/ES.

In the 1960's, widespread tendencies toward deinstitutionalization of mental hospitals and schools for the retarded resulted in dependency on community programs and care - giving resources to service the needs of the mentally handicapped. This study identifies and examines certain barriers to the achievement of deinstitutionalization objectives and discusses the impact of this situation on clients, staff, and care giving as a whole. In order to obtain a broad cross section of views about deinstitutionalization processes, researchers interviewed 279 administrators and personnel from hospitals, schools, and programs in California, Colorado, Florida, Illinois, Massachusetts, New York, and Washington. Common problems with deinstitutionalization identified as significant by the vast majority of respondents are difficulties in defining agency and staff roles and responsibilities, opposition to deinstitutionalization from within the political and care - giving systems, and difficulties in accessing the generic services needed by clients. Clients often are shuffled between aftercare service agencies and multidiagnosis agencies and can not successfully negotiate for medical and dental, vocational, transportation, and special educational services. Economic and cost - related issues were a significant source of difficulty since funding regulations for Medicaid, private insurance benefits, and State matching funds often determined the service level rather than client needs. Clients and staff also experienced frustration when seeking community residences due to discriminatory zoning restrictions and housing markets. The results of this study indicate that the objectives of deinstitutionalization -- to provide care in a less restrictive setting, at the lowest cost possible, supplemented with supportive services -- often have not been met. Recommendations are presented, such as provision of long - term funding for case management services, revision of Social Security eligibility requirements, and redesigning of HUD application processes to encourage small, normalized community settings. References are provided.

SHR-0003168 PC **A03**/MF **A01**
Office of Education, Washington, DC. Inter-Agency Task Force on Comprehensive Programs for School - Age Parents.
Comprehensive Approach to the Problem of Adolescent Pregnancy. A General Survey of the Literature.
Bibliography
Jan 74, 37p

This bibliography of literature and information sources concerning adolescent pregnancy contains approximately 500 entries, including books, journal articles, newspaper articles, journals and newspapers, and reports published between 1960 and 1973. The purpose of this bibliography is to provide a list of publications useful in understanding the scope and ramifications of adolescent pregnancy for program administrators, teachers, doctors, social workers, and others. It may be used as an aid for organizing and developing the essential component services for comprehensive programs for school - age parents. The material is divided into nine categories: (1) definition of the

problem; (2) description of existing programs and services; (3) health, nursing, and medical considerations; (4) psychology, psychiatry, and social services; (5) educational policies and programs; (6) prevention through sex education, contraception, and family planning; (7) young marriages; (8) adolescent sexuality; and (9) family considerations (i.e., the unmarried mother and father, family relationships, and child placement). Entries are listed alphabetically by author within these nine categories. (Author abstract modified).

SHR-0003170 PC **A03**/MF **A01**
National Institutes of Health, Bethesda, MD.
Social Consequences of Teenage Childbearing.
Harriet B. Presser. Oct 75, 35p
Presented at the Conference on the Consequences of Adolescent Pregnancy and Childbearing in Bethesda, Md., October 29 and 30, 1975.

To study the determinants and early consequences of the age at which women first give birth, a representative sample of 408 women was drawn from the birth records of females residing in 3 boroughs of New York City -- Brooklyn, the Bronx, and Queens. First generation migrants from Puerto Rico and elsewhere were excluded, as were nonwhites other than blacks. Black women constituted 38 percent of the sample, and 30 percent of all first births were illegitimate. Personal interviews indicated that teenage mothers approached motherhood with similar family size expectations as women who were older at time of first birth, although teenage mothers were less likely to plan the timing of motherhood. Almost all unmarried mothers wanted to marry, although not necessarily the father of their child. Many teenage mothers indicated that they had wanted to go further in school before they became pregnant. These findings suggest that, given more child - free time, some of these women would have accomplished more in terms of marriage and education prior to motherhood. This time also would have given them more opportunity to work prior to their first birth. To the extent that marriage, school, and work are socially advantageous to women and women want to achieve in these roles, the data indicate that negative social consequences result from early motherhood. Tabular data and references are included.

SHR-0003172 PC **A03**/MF **A01**
Office of Education, Washington, DC. Bureau of Elementary and Secondary Education.
School-Age Pregnancy, Childbearing, and Childrearing: A Research Review.
Ernest A. Crider. 19 Nov 76, 38p

To heighten professional awareness of existing deficiencies in the state of knowledge concerning the sources and impact of adolescent pregnancy, research is reviewed in several areas involving adolescent pregnancy: (1) medical complications for the mother and child; (2) economic, social, and educational risks; and (3) adolescent sexuality and pregnancy. It is evident from this review that not enough is known about the causes and consequences of adolescent pregnancy and that not enough emphasis has been placed upon primary prevention. It is clear that no single explanation or set of explanations account for the phenomenon. The psychodynamic explanations offered are not sufficient to explain the majority of teenage pregnancies, nor are the sociodynamic causes cited in earlier studies sufficiently documented. Not enough is known regarding the causative factors underlying the physical risks associated with it, in part due to a misleading emphasis on the fate of members of lower socioeconomic groups and a research slant encouraged by the structure of health services in the U.S. which concentrate on the poor and the nonwhite. It is also clear from the cited research studies that not enough is known about the long - term impact of early pregnancy and parenthood upon family well - being, in part due to the omission of maternal or paternal age as a significant variable to be assessed in relationship to family income and asset accumulation. A significant area for future research is the fate of the resultant children. References are noted.

SHR-0003213 PC **A03**/MF **A01**
Wisconsin Univ.-Milwaukee. Region V Child Abuse and Neglect Resource Center.
Woman Battering.
Annotated bibliography
Claudette McShane. Jul 77, 31p
Grant DHEW-90-C-1590

This annotated bibliography lists materials on spouse battering and family violence in general and on woman battering in particular. It is intended for use by professionals and by persons interested in the problem. It contains references to academic research efforts, clinical reports on therapeutic interventions, feminists' writings, and recommendations for amelioration of this abuse. References to listings of women working on the problem of wife abuse and available handbooks to assist those wishing to begin projects are also included. The material is organized alphabetically according to type -- books, articles (professional journals, popular magazines, unpublished papers), newsletters, guides (handbooks, directories, bibliographies, legislation), and media. Approximately 150 entries are listed for titles available both commercially and noncommercially. Names and addresses of sources are listed for noncommercially available matter. (Author abstract modified).

SHR-0003219 PC **A10**/MF **A01**
Committee on Finance (U.S. Senate). Subcommittee on Health.
Health Care Problems in Rural and Small Communities (Macon, Ga., and Atlanta, Ga.) Joint Hearings Before the Subcommittee on Health of the Committee on Finance and Committee on Governmental Affairs, United States Senate, 9th Congress, 1st Session, August 16 and 17, 1977.
Aug 77, 215p

The U.S. Senate Subcommittee on Health of the Committee on Finance and the Committee on Governmental Affairs met in Macon, Ga., on August 16, 1977, to discuss the need to make good health care available to citizens in rural and small communities. The proceedings of these joint committee hearings indicate that there is an uneven and unfair distribution of health care resources in the United States, as typified by the complete absence of resident physicians in 14 counties in Georgia, and by an infant mortality rate in central Georgia that is higher than the national rate in Bulgaria and Jamaica. Although a great deal of waste has been identified in Federal health programs, they can be effectively modified to prevent abuse and serve the public efficiently. Testimony before the joint committee was presented for the Administration by Dr. George Reich, the regional health administrator of the U.S. Public Health Service. Dr. Reich indicated the dilemma of the Mercer Medical School which cannot be eligible for Federal funding until it is accredited, but which does have the resources needed to prepare for accreditation unless those resources are provided by the Government. An exception to the accreditation requirement was recommended. Testimony by public witnesses included statements by the president of Atlanta Blue Cross, representatives of the Georgia Medical Association, and by the administrators of several Georgia hospitals. Many rural practitioners, including osteopaths and physician's assistants, have been confronted with rising costs that are not matched by Medicare and Medicaid. Additional information includes a proposed plan for family practitioners in Georgia.

SHR-0003486 PC **A03**/MF **A01**
Washington Public Affairs Center of the Univ. of Southern California, DC.
Clergy's Role in Help Seeking and Receiving in Urban Ethnic Neighborhoods.
Arthur J. Naparstek. 1978, 42p
Grant PHS-MH-2653
Prepared for presentation at the University of Maryland 7th Annual Community-Clinical Workshop, Nov. 16, 1978.

The neighborhood context of the clergy's role in seeking and receiving help is examined, based upon research data from a 4 - year study of the operation of helping networks in urban ethnic neighborhoods. The focus is upon clergy and human service agency staff, including their views of the neighborhood, their perceptions of problems of individuals in the community and networks for addressing these problems, their perceptions of the obstacles that prevent effective help for needy persons, the role they play in counseling individuals who come to them for help, and how the clergy and human service agencies perceive themselves and one another in their helping roles. The findings show that there are large numbers of clergy and human service professionals in the community to whom people bring their problems. Each group tended to be familiar with the problems of particular population groups in the community and with particular helping resources. The clergy were especially close to neighborhood concerns. The most critical issue revealed is the fragmentation of helping networks in two areas. First, the service networks are incomplete; there are some community problems for which there are insufficient services. Second, there are insufficient linkages between the lay (clergy and concerned citizens) and professional helping networks. Clergy and human service professionals do not interact frequently and are not linked with one another. Each group tends to be protective of its own expertise, while mistrusting the perspectives and skills of the other group. The Neighborhood and Family Services Project of Southeast Baltimore, Md., is presented as an intervention model for linking the concerns and activities of clergy, concerned citizens, and human service professionals. References are provided.

SHR-0003487 PC **A02**/MF **A01**
Washington Public Affairs Center of the Univ. of Southern California, DC.
Toward a New Policy Framework for Implementing the New Partnership: A National Self-Help Development Fund.
Arthur J. Naparstek, Wendy R. Sherman, and David Biegel. 1 Jun 78, 24p

The need for a Federal policy framework for capacity building in self - help programs is of growing concern to neighborhoods where people need to have some control over an increasingly complex, bureaucratic, and centralized society. Self - help efforts can serve to expand and revitalize services at a time when no budget is large enough to meet the service need. These efforts are not substitutes for planning and services required at city, State, or Federal levels. What takes place in the neighborhood is the building and rebuilding of natural support systems, both a long neglected resource and an effective mode of prevention of urban problems. Although there are some potential dangers in such efforts, such as the emergence of elitist, competitive groups possibly fueling ethnic and racial prejudice, the Neighborhood and Family Services Project in Milwaukee, Wis., may serve as an example of system responsibility and accountability. Out of the project experience came a series of self - help principles which show that any Federal policy must (1) recognize the pluralistic nature of neighborhoods; (2) allow for different priorities in different groups; (3) view the neighborhood as a positive resource; (4) trust the neighborhood's ability to settle on its own terms; (5) encourage the partnership between neighborhood, government levels, private sector, and voluntary organizations; (6) allow for direct funding to neighborhood groups, rather than requiring prior approval from local government; (7) finance planning and capacity building as well as the usual service efforts; (8) provide seed money to groups who may not yet have a track record; (9) ensure that groups can begin on a small scale and grow at their own speed; (10) encourage decentralization, and nondependence on the government; (11) encourage all - citizen involvement; and (12) increase options for people so that they have a measure of choice and power over their own lives. Some programs, such as ACTION's Urban Volunteer Corps, HUD's Neighborhood Self - Help Program, and the developing National Coop Bank, are moving in the direction of achieving these goals. It is concluded that there must be a devolution of authority from the government to the neighborhood. References are provided.

SHR-0003488 PC **A03**/MF **A01**
Washington Public Affairs Center of the Univ. of Southern California, DC.
Community Mental Health Empowerment Model: Assumptions Underlying the Model/ Review of the Literature.
Arthur J. Naparstek. Jul 78, 27p
Grant PHS-MH-26531
See also related document, SHR-0003489. Executive Summary available from PROJECT SHARE.

P.O. Box 2309, Rockville, Md. 20852 as SHR-0003488/ES.

The Neighborhood and Family Services Project, funded by a 4 - year National Institute of Mental Health Grant, is an action research and demonstration program designed to (1) mobilize ethnic neighborhoods around mental health issues, (2) develop model programs to overcome identified obstacles to effective service delivery, and (3) develop policy initiatives for the national, State, and local levels to institutionalize project findings. The model presented is the result of 2 years of experience with the Neighborhood and Family Services Project in Baltimore, Md., and Milwaukee, Wis. Data sources consisted of 300 interviews of community leaders and helpers in each city, 250 interviews of a random sample of community residents in each city, and statistical data from a variety of official sources. Data analysis revealed the following: (1) the family is the focus of many interrelated problems for all the population groups; (2) a network of helping systems is needed to provide supports to single - parent, two - parent or elderly families; (3) the fragmentation among helpers as well as between lay and professional helpers is a major obstacle to people seeking help; and (4) community residents are not using the strengths within the community. Demonstration projects designed to meet some of these needs are briefly described for each city. Policy implications include (1) Federal and Federally - funded mental health programs should be mandated to explore linkages to the community and neighborhood helping networks, (2) Federal funds should be used to train and retrain mental health and human service workers to function within community social support systems and helping networks, and (3) a new type of funding mechanism is needed that would allow communities to determine their own needs and ways of meeting those needs.

SHR-0003489 PC **A03**/MF **A01**
Washington Public Affairs Center of the Univ. of Southern California, DC.
Two Year Report March 1, 1976 - May 15, 1978.
Arthur J. Naparstek. Jul 78, 40p
Grant PHS-MH-26531
See also related document, SHR-0003488. Executive Summary available from PROJECT SHARE, P.O. Box 2309, Rockville, Md. 20852 as SHR-0003489/ES.

Literature that serves as background for the Community Mental Health Employment Model is reviewed. A description of the model can be found in a companion volume. Assumptions underlying the development of the model are stated, followed by discussion of the literature from which each assumption is derived. The first assumption notes that social class and ethnicity are important variables affecting attitudes toward and use of mental health services; there is a documented underutilization of professional mental health services by ethnic working populations. A second assumption states that neighborhood attachment is a positive resource that can and should be used as a basis for community mental health services. It is the neighborhood that is the context for a strong social fabric and the mediating institutions that influence the most immediate life experiences. A third assumption indicates that a sense of competency, self - esteem, and power is important to the mental health of the community. Professional services should be designed to nurture these mental health factors. A fourth assumption notes that the community, not agencies, are responsible for the mental health of the neighborhood. The role of professional services vis - a - vis the role of the local neighborhood in providing support to community members needs to be rethought. A final assumption observes that, as part of the overall human services system, mental health services suffer from problems of accessibility, funding, community involvement, duplication, lack of coordination, and fragmentation of services. These problems need to be addressed as part of an overall human services system approach to service delivery. A bibliography is provided.

SHR-0003492 PC **A06**/MF **A01**
Washington Public Affairs Center of the Univ. of Southern California, DC.
Community Analysis Data Report. Volume I: Appendix. Neighborhood and Family Services Project.
Arthur J. Naparstek. 31 Oct 78, 113p
Grant PHS-MH-2653
See also companion document, SHR-0003493. Executive Summary available from PROJECT SHARE, P.O. Box 2309, Rockville, Md. 20852 as SHR-0003492/ES.

An appendix to the Community Analysis Data Report on the Neighborhood and Family Services Project, this report presents data and findings in tabular form. The project recognizes and uses the unique cultural and organizational differences among neighborhoods by building and rebuilding neighborhood support systems to reduce negative attitudes associated with mental health services among ethnic working class populations, develop service deliveries congruent with life styles of these populations, and determine necessary rearrangements of formal service delivery and develop policy on the national, State, and local levels in support of community mental health services. The tables in this appendix are organized according to the chapters in which they appear and contain notes explaining the form of the data and any derivations from standard statistical analysis. The report contrasted both the availability of various mental health services and the use of these services in Baltimore, Md., and Milwaukee, Wis. In both cities, according to neighborhood leaders and other social service groups surveyed, the major problems of teens stem from family relationships, use of drug and alcohol, and lack of recreational opportunities. Milwaukee teens were more likely to seek help, while Baltimore teens avoided mental health services. Separated and divorced persons were likely to seek help, as were the elderly. Domestic problems and finances were listed as the major problems of families. In both cities, distressed families were either coping or getting help. In Baltimore, community leaders, community groups, and professional agencies were all good sources of mental health referral information, but schools were unaware of services, even for teens. Milwaukee schools were better informed but community resource personnel in the city lacked referral information.

SHR-0003493 PC **A14**/MF **A01**
Washington Public Affairs Center of the Univ. of Southern California, DC.
Community Analysis Data Report. Volume I: First Level Analysis. Neighborhood and Family Services Project.
Arthur J. Naparstek. 31 Oct 78, 315p
Grant PHS-MH-2653
See also Appendix, SHR-0003492. Executive Summary available from PROJECT SHARE, P.O. Box 2309, Rockville, Md. 20852 as SHR-0003493/ES.

Basic data findings and single variable descriptions are presented from a survey of community helpers in an ethnic community in Baltimore, Md., and an ethnic community in Milwaukee, Wis. The survey is part of a larger project which develops linkages between informal (lay) helpers and formal (professional) community helpers. The survey is viewed as a tool for assessing community mental health problems and the strengths and weaknesses of existing linkages for service delivery. In Baltimore, interviews were completed with 37 clergy, 19 school principals, 63 neighborhood leaders, 9 pharmacists, 9 physicians, and 110 human service personnel. In Milwaukee, interviews were given to 25 clergy, 33 school personnel, 62 neighborhood leaders, 16 pharmacists, 12 physicians, 27 natural helpers, and 95 human service personnel. Each questionnaire consisted of demographic and identification information; attitudes and knowledge of neighborhood and community; identification of problems and helping networks for teens, families, the separated or divorced, elderly, and others; information about the counseling role of the interviewee; and reactions to a series of vignettes which described individuals with varying degrees of mental health problems. Central themes emerging from the data are discussed under the topics of community strengths, needs, obstacles, and potentials. The need for a network of helping systems at the neighborhood level building upon and using the inherent strengths of existing helping patterns is a principal conclusion from the data. Implications of this conclusion for Federal legislation and policy are discussed. Tabular data and references are provided.

6. BIOLOGICAL AND MEDICAL SCIENCES

6A. Biochemistry

AD-A075 627/0 Not available NTIS
Naval Submarine Medical Research Lab Groton Ct
Effect of Intermittent Exposure to 3% CO2 on Respiration, Acid-Base Balance, and Calcium-Phosphorus Metabolism,
K. E. Schaefer , C. R. Carey , J. H. Dougherty, Jr. , C. Morgan , and A. A. Messier. Mar 78, 20p
Rept no. NSMRL-912
Availability: Pub. in Undersea Biomedical Research, Submarine Supplement, pS115-S134 1979 (No copies furnished by DTIC).

No abstract available.

AD-A075 665/0 Not available NTIS
Defence Research Establishment Suffield Ralston (Alberta)
Differences in Purity of Commerical Samples of Hemicholinium-3: Effects on High Affinity Choline Uptake, Neuromuscular Transmission, Acetylcholinesterase and Carbachol and Acetylcholine Contractions,
John G. Clement , Peter A. Lockwood , B. J. Rylett , and E. H. Colhoun. 9 Jan 79, 6p DRB-REPRINT-4227
Availability: Pub. in Life Sciences, v24 n7 p615-620 1979 (No copies furnished by DTIC).

No abstract available.

AD-A075 758/3 Not available NTIS
Calgary Univ (Alberta) Biopolymer Research Group
Infrared Spectroscopic Studies of Solvent-Induced Conformational Changes in Globular Proteins,
Ada L. Jacobson , and Peter J. Krueger. 8 Oct 74, 10p Rept no. PUB-75-01
Availability: Pub. in Biochimica et Biophysics Acta, v393 p274-283 1975 (No copies furnished by DTIC).

No abstract available.

AD-A075 797/1 Not available NTIS
National Research Council of Canada Ottawa (Ontario)
Synthesis of DNA's and Their Biological Roles,
Saran A. Narang. 20 Dec 73, 20p Rept no. NRC-13713
Availability: Pub. in Indian Jnl. of Physics and Proceedings of the Indian Association for the Cultivation of Science, v32 p1-19 1973 (No copies furnished by DTIC).

No abstract available.

AD-A075 930/8 PC **A02**/MF **A01**
Walter Reed Army Inst of Research Washington Dc
Different Effects of Concanavalin A and E-Phytohemagglutinin upon Lymphocyte Glycosyltransferase Activities,
Stephen F. Speckart , David H. Boldt , and Katherine L. Ryerson. 20 Mar 78, 10p
Pub. in Cancer Research, v38 p4554-4561 Dec 78.

No abstract available.

AD-A076 179/1 PC **A02**/MF **A01**
Army Inst of Dental Research Washington D C
Reverse Phase HPLC Analysis by Dansylation of Amino Acids in Monkey Salvia,
Robert A. Miller , Rodolfo Bongiovanni , Timothy Boehm , Norman E. Bussell , and Judson R. Wynkoop, II. 26 Oct 79, 21p

Chromatographic analysis of the amino acid content of saliva previously has been done by cation exchange and thin layer chromatography. This report describes the application of HPLC in the analysis of salivary amino acids using precolumn derivatization with dansyl chloride. The derivatization procedure allowed dansylation without prior deproteinization and subsequent extraction into methanol. The use of the fluorescent derivative increases the sensitivity of this technique over the

classical cation exchange chromatography technique using ninhydrin reagent. The chromatography of these salivary amino acids demonstrated both identifiable as well as unidentifiable peaks. Of the eleven amino acids identified, seven were quantified. All eleven of the identified amino acids have also been reported in human saliva by use of cation exchange chromatography. The amino acid levels found in baseline monkey saliva are quantitatively similar to the levels found in unstimulated human saliva. However, the response of the monkeys to pilocarpine demonstrated quantitative differences in salivary amino acid levels from the levels observed in human salivary specimens after wax stimulation. After administration of atropine sulfate (antidote), only five of the amino acid levels in monkey saliva returned to baseline. (Author)

AD-A076 276/5 Not available NTIS
Guelph Univ (Ontario)
Trypsin-Uncoupled Synthesis and Secretion of Yeast Invertase: Implications for the Mechanism of Secretion,
Bruce E. Holbein , and Denis K. Kidby. Jan 79, 8p
Availability: Pub. in Canadian Jnl of Microbiology, v25 n4 p528-534 1979 (No copies furnished by DTIC).

No abstract available.

CONF-781048-1 PC **A02**/MF **A01**
Argonne National Lab., IL.
Charge Separation in Synthetic Photo-Reaction Centers.
J. J. Katz. 1978, 23p
Contract W-31-109-ENG-38
Workshop on light-induced charge separation at interfaces in biological and chemical systems, Berlin, F.R. Germany, 16 Oct 1978.

On the basis of electron paramagnetic resonance studies, there is good reason to suppose that the primary electron donor in plant and bacterial photo-reaction centers is a special pair of chlorophyll molecules. The donor--acceptor coordination interactions characteristic of chlorophyll are used to suggest a structure for the chlorophyll special pair. Chlorophyll special pairs with the suggested structure have been prepared in the laboratory. These synthetic reaction centers mimic the essential features of P700 and P865 and provide a useful route to the study of electron transfer from in vivo photo-reaction centers. (ERA citation 04:027960)

CONF-790563-1 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Prostaglandin Enhancement of Skin Tumor Initiation and Promotion.
S. M. Fischer, G. L. Gleason, J. S. Bohrman, and T. J. Slaga. 1979, 17p
Contract W-7405-ENG-26
International prostaglandin conference, Washington, DC, USA, 27 May 1979.

Various prostaglandins or indomethacin were applied topically at the same time as the topical application of the tumor promoter 12-O-tetradecanoylphorbol-13-acetate (TPA), or the carcinogen 7,12 dimethybenzanthracene (DMBA). Tumor promotion was enhanced by two groups of prostaglandins and by indomethacin but was inhibited by one prostaglandin group or arachidonic acid. The mechanism operative in each stage is believed to be different. (ERA citation 04:049204)

COO-1599-153(Pt.4) PC **A05**/MF **A01**
Michigan State Univ., East Lansing. Dept. of Botany and Plant Pathology.
Carbonic Anhydrase Levels and Internal Lacunar CO sub 2 Concentrations in Aquatic Macrophytes.
C. I. Weaver. 1979, 90p
Contract EY-76-S-02-1599
Thesis.

Carbonic anhydrase levels were examined in a variety of aquatic macrophytes from different habitats. In general, carbonic anhydrase levels increased across the habitat gradient such that activities were low in submersed aquatic macrophytes and high in emergent macrophytes with floating-leaved and free-floating plants exhibiting intermediate activities. Internal lacunar CO sub 2 concentrations were analyzed in relation to carbonic anhydrase activities. There was no correlation between these two parameters. Internal CO sub 2 concentrations ranged from low to high in submersed macrophytes, but were low in floating-leaved and emergent macrophytes. The observed internal CO sub 2 concentrations are discussed in relation to the individual morphologies of the plants and the environments in which they occurred. (ERA citation 04:052192)

LA-UR-79-1648 PC **A03**/MF **A01**
Los Alamos Scientific Lab., NM.
Architecture and Dynamics of Isotopically Labelled Macromolecules by Nuclear Magnetic Resonance Spectroscopy.
N. A. Matwiyoff. 1979, 27p CONF-790680-1
Contract W-7405-ENG-36
NATO A.S.I. series on ESR and NMR of paramagnetic species in biological and related systems, Acquafredda di Maratea, Italy, Jun 1979.

The use of exp 13 C is considered using NMR spectra of cell suspensions. Biochemical reaction kinetics are still unclear in the study of environmental and structural perturbations of amino acids and peptides; thus needs still exist for this labelling technique. (ERA citation 04:052193)

6B. Bioengineering

COO-2155-21 PC **A08**/MF **A01**
Utah Univ., Salt Lake City. Inst. for Biomedical Engineering.
Biomedical Engineering Support. Final Report, June 15, 1971--June 30, 1979.
W. J. Kolff, G. Sandquist, D. B. Olsen, and L. M. Smith. 1979, 173p
Contract EY-76-S-02-2155

On June 15, 1971 the Institute for Biomedical Engineering at the University of Utah contracted with the USAEC to provide biomedical support for an Artificial Heart Program. The goal of the program was to conceive, design, construct and test a prototype artificial heart system powered by an implantable radioisotope heat source. The system would serve as a total artificial heart for animal experiments and for studies directed at developing a total heart replacement system for humans. The major responsibilities of the Institute during the eight year contract period were to design, construct and test all blood handling components of the system and prove in vivo accommodation, performance and adequacy of the system in experimental animals. Upon completion of development of the Implantable Version of the Bench Model Biood Pump, a long series of comprehensive in vitro and in vivo experiments were conducted. In vivo experiments with the system conducted in calves demonstrated the general accommodation, adequate performance and good capacity to sustain the calf as a heart model for up to 36 days. During the more successful in vivo experiments the implanted calves were able to eat, drink, stand, exercise on a treadmill, and exhibited normal blood chemistry and pulmonary function. (ERA citation 04:051191)

LA-UR-79-1760 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Electronic Identification and Remote Temperature Monitoring in Livestock Management and Disease Control.
G. L. Seawright, and D. M. Holm. 1979, 7p
CONF-790724-1
Contract W-7405-ENG-36
21. world veterinary congress, Moscow, USSR, 1 Jul 1979.

The system described here could form the basis for an international livestock identification system with disease detection capability. Veterinarians throughout the world should start to consider how widespread use of such a system could alter their approach to food animal disease control. (ERA citation 04:052205)

N80-10782/4 PC **A02**/MF **A01**
Pennsylvania State Univ., University Park.
Kidney Cell Electrophoresis.
Progress Report.
P. Todd. Jun 79, 25p NASA-CR-160353
Contract NAS9-15584

A kidney cell electrophoresis technique is described in four parts: (1) the development and testing of electrophoresis solutions; (2) optimization of freezing and thawing; (3) procedures for evaluation of separated kidney cells; and (4) electrophoretic mobility characteristics of kidney cells.

6C. Biology

AD-A075 642/9 Not available NTIS
Toronto Univ (Ontario) Dept of Parasitology
Structure of Cuticular Mechanoreceptors of Arthropods,
Susan B. McIver. 1975, 17p
Availability: Pub. in Annual Review of Entomology, v20 p381-397 1975 (No copies furnished by DTIC).

No abstract available.

AD-A075 765/8 Not available NTIS
Alberta Univ Edmonton Dept of Entomology
Digestive Processes of Haematophagous Insects. VII. Comparison of Animal-Fed and Membrane-Fed Adults of 'Glossina morsitans morsitans' Westw. (Diptera, Glossinidae),
R. H. Gooding. 2 Nov 73, 7p
See also AD-737 454.
Availability: Pub. in Bulletin of Entomological Research, v64 p175-181 1974 (No copies furnished by DTIC).

No abstract available.

AD-A075 793/0 Not available NTIS
MacDonald Coll Ste Anne de Bellevue Dept of Entomology
A Summary of Published Information for Field and Laboratory Studies of Biting Midges, 'Culicoides' Species (Diptera: Ceratopogonidae),
W. E. Kwan , and F. O. Morrison. 1974, 11p
Availability: Pub. in Annales de la Societe Entomologique du Quebec, v19 n3 p127-137 Sep 74 (No copies furnished by DTIC).

No abstract available.

AD-A075 913/4 PC **A02**/MF **A01**
Texas Univ At Houston School of Public Health
An Evaluation of Morphological Characters for Separating Females of 'Aedes (Ochlerotatus) atlanticus' Dyar and Knab and 'Aedes (Ochlerotatus) tormentor' Dyar and Knab (Diptera: Culicidae),
D. R. Roberts, and J. E. Scanlon. 1979, 7p
Contract DADA17-72-C-2022
Pub. in Mosquito Systematics, v11 n3 p203-208 1979.

No abstract available.

AD-A075 932/4 PC **A02**/MF **A01**
Armed Forces Radiobiology Research Inst Bethesda Md
The Heterogeneity of Macrophage-Granulocyte Precursor Cell Populations,
S. J. Baum. 1979, 7p
Pub. in Experimental Hematology Today, p41-44 1979.

No abstract available.

AD-A075 933/2 PC **A02**/MF **A01**
Armed Forces Radiobiology Research Inst Bethesda Md
Evidence for an Intracellular Calcium Store Releasable by Surface Stimuli in Fibroblasts (L Cells),
Maryanna P. Henkart , and Phillip G. Nelson. 12 Apr 78, 21p
Pub. in the Jnl. of General Physiology, v73 p655-673 1979.

No abstract available.

AD-A075 938/1 PC **A12**/MF **A01**
California Univ Davis Dept of Environmental Horticulture
Flood Tolerance in Plants: A State-of-the-Art Review.
Final rept.,
Thomas H. Whitlow , and Richard W. Harris. Aug 79, 260p WES-TR-E-79-2

Contract DACW39-77-M-3423
Report on Environmental and Water Quality Operational Studies.

Both the basic aspects of flood tolerance in plants and the applied aspects of establishing vegetation on reservoir shorelines are discussed through a comprehensive literature review. Flooding imposes complex stresses on many vascular plants, most of which arise from the depletion of oxygen in the flooded soil. Soil anoxia results in conditions that favor reduction reactions and anaerobic metabolism, which lead to the formation of ions in reduced valence states and organic acids and gases in concentrations exceeding those in aerobic soils. Changes in pH accompanying soil reduction may also alter nutrient availability. Plants avoid or mitigate these flooding stresses by either transferring oxygen into their roots via anatomical modifications in the shoot and/or by utilizing anaerobic respiration pathways in their roots. In addition to a plant's ability to withstand soil anaerobiosis, plant age, plant size, flood depth, flood duration, flood timing, substrate composition, wave action, and other factors determine survivorship when plants are flooded. Studies are reviewed that correlate these factors with species tolerances. A detailed summary of research relating directly to reservoir revegetation is provided, and species tolerances are assessed for each of the Army Corps of Engineers Divisions. Techniques for the establishment of vegetation around reservoirs are discussed, as are examples of species mortality prediction and impact assessment.

AD-A076 277/3 Not available NTIS
Toronto Univ (Ontario) Dept of Parasitology
Fine Structure of Sunken Thick-Walled Pegs (Sensilla Ampullacea and Coeloconica) on the Antennae of Mosquitoes,
K. S. Boo , and S. B. McIver. 24 Jul 74, 10p
Availability: Pub. in Canadian Jnl. of Zoology, v53 n3 p262-266 1975 (No copies furnished by DTIC).

No abstract available.

BNL-26282 PC **A02**/MF **A01**
State Univ. of New York at Stony Brook.
Determining Biological Fine Structure by Differential Absorption of Soft X-Rays.
B. J. Panessa-Warren, and J. B. Warren. Jun 79, 23p CONF-790674-3
Contract EY-76-C-02-0016
Conference on ultrasoft X-ray microscopy, New York, NY, USA, 13 Jun 1979.

The use of soft x-ray contact microscopy in examining histochemically treated human tissue embedded in plastic and exposed as unstained thin sections is demonstrated. When our preliminary data revealed that we could clearly image not only the histochemical reaction product, but the unstained biological fine structure of the surrounding tissues, we decided to test our hypothesis further and see if we could image unstained biological molecular aggregates as well. For this part of the investigation, we chose to examine hydrated proteoglycan aggregates. Proteoglycans are an essential component of the organic matrix of cartilage, and play a primary role in the retention and maintenance of extracellular water. To avoid any artifacts due to the introduction of exogeneous materials, and examine the proteoglycan aggregates in their hydrated, natural configuration, we made contact x-ray images of isolated proteoglycan aggregates in water. (ERA citation 04:052194)

CONF-781154-2 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Preliminary Studies of Bobcat Activity Patterns.
J. T. Kitchings, and J. D. Story. 1978, 17p
Contract W-7405-ENG-26
32. conference of the Southeastern Association of Fish and Wildlife Agencies, Hot Springs, VA, USA, 5 Nov 1978.

Home range and activity patterns were determined for two radio-collared bobcats, one male and one female, in an eastern Tennessee hardwood forest. Home range of the male was calculated to be approximately 3076 ha while the female utilized 1416 ha. Both bobcats' ranges were larger than previously reported values for the southeast. Measurements of both average net distance traveled per day showed the male moved a statistically significant greater distance than the female. The larger home ranges may be primarily the result of relatively low prey populations in the mountainous terrain of East Tennessee as compared to upper coastal plains areas where most of the previous research on southeastern bobcats has been carried out. (ERA citation 04:031405)

CONF-790537-1 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
CHO/HGPRT Mutagenicity Assay. III. Adaptation for Mutagen Screening.
J. P. O'Neill, and A. W. Hsie. 1979, 13p
Contract W-7405-ENG-26
Cold Spring Harbor symposium on quantitative mammalian cell mutagenesis and mutagen screening, Cold Springs Harbor, NY, USA, 6 May 1979.

This assay system has been employed for a variety of quantitative studies of mutation induction in mammalian cells (Hise et al., 1978). The development of interest in utilizing this system for mutagen screening has prompted us to evaluate those aspects of the system which necessitate the largest time and monetary investments, and to investigate the possibilities of applying insights gained from our basic research program to optimize use of the system for routine testing procedures. This paper describe our progress in the areas of phenotypic expression time and the density dependent recovery of mutant colonies in selective medium. (ERA citation 04:052195)

CONF-790537-4 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
CHO/HGPRT Mutagenicity Assay. I. Experimental Procedure.
J. P. O'Neill, and A. W. Hsie. 1979, 18p
Contract W-7405-ENG-26
Cold Spring Harbor symposium on quantitative mammalian cell mutagenesis and mutagen screening, Cold Springs Harbor, NY, USA, 6 May 1979.

Efforts to develop such a system utilizing Chinese hamster ovary (CHO) cells and the purine analogue 6-thioguanine (TG) to quantify mutation induction at the hypoxanthine (Hx)-guanine phosphoribosyl transferase (HGPRT) locus are described. These studies include the definition of such parameters as medium, mutagen treatment conditions, subculture protocol, phenotypic expression time, and optimal conditions for selection of the mutant phenotype. The selection conditions have been established in terms of medium, serum, concentration of selective agent, and cell density. The system has been used to determine the mutagenicity of various physical and chemical agents. (ERA citation 04:052198)

CONF-790906-24 PC **A02**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
Potential for Utilizing Geothermal Resources for the Culture of Freshwater Fish.
J. F. Sullivan, and M. H. Beleau. 1979, 4p
Contract EY-76-C-07-1570
Geothermal Resources Council annual meeting, Reno, NV, USA, 24 Sep 1979, Portions of document are illegible.

An evaluation of geothermal aquaculture demonstrated significant commercial potential. Growth rates of cultured channel catfish and common carp were high throughout the study. Various physiological and morphological parameters were monitored; no differences were detected between fish reared in geothermal or fresh water. (ERA citation 04:054584)

COO-1332-131 PC **A05**/MF **A01**
Minnesota Univ., Minneapolis.
Vertebrate Behavior and Ecology. Progress Report, 1 July 1978–30 June 1979.
J. R. Tester, and D. B. Siniff. Jul 79, 80p
Contract EY-76-S-02-1332

Efforts in engineering design and development this year emphasized improvement in the quality and versatility of radio transmitters, use of microprocessors in an automated fish tracking system, and construction of an automated system to monitor movements and activities of aquatic mammals in response to water temperature. Improved radio transmitters were used on a variety of species including sea otters, manatees, and wall-eyed pike. The fish tracking system, installed at Monticello, Minnesota, will next be modified for monitoring marine mammal movements. The temperature data logging system was tested on manatees in the St. John River near Blue Springs, Florida. The long-term goal in the subproject on evaluation of census methods is to utilize the extensive experience, technology, and equipment developed over the years in radio telemetry to resolve basic problems in animal census and population study methods. During the past year, efforts have resulted in information on activity patterns and the behavioral repertoire of sea otters and on the response of otters to contamination by Alaskan crude oil. Three preliminary manuscripts presented as part of this report describe these aspects in detail. (ERA citation 04:052191)

DP-MS-79-16 PC **A03**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Life History, Development Processes, and Energetics of the Burrowing Mayfly.
R. S. Harvey, R. L. Vannote, and B. W. Sweeney. 1979, 30p CONF-790734-1
Contract EY-76-C-09-0001
International conference on ephemeroptera, Winnipeg, Manitoba, Canada, 4 Jul 1979.

Dolania americana Edmunds and Traver is a burrowing mayfly known only from three coastal plain streams in the southeastern United States. In Upper Three Runs, a spring-fed blackwater stream in South Carolina, D. americana is the dominant mayfly species inhabiting the sandy substrate. Larvae are very distinct morphologically, being highly adapted for burrowing in sandy substrate. D. americana are predators and feed mainly on midge larvae. This paper describes quantitatively: (1) the bioenergetics and developmental dynamics of the larval stage; (2) adult emergence and fecundity; and (3) biochemical characteristics of the eggs. These data are used to delineate both the life history of D. americana and the overall importance of this species to energy flow in Upper Three Runs. (ERA citation 04:052159)

PB80-112865 PC **A02**/MF **A01**
National Marine Fisheries Service, Seattle, WA.
History of the Fishery and Summary Statistics of the Sockeye Salmon, 'Oncorhynchus nerka', Runs to the Chignik Lakes, Alaska, 1888-1966.
Technical rept.,
Michael L. Dahlberg. Aug 79, 25p NOAA-TR-NMFS-SSRF-735, NOAA-79092601

Annual runs of sockeye salmon to the Chignik Lakes, Alaska, decreased from an average of 1.9 million during the period 1922-39 to an average of 0.9 million during the period 1949-1966. In order to study the dynamics of the runs' historic catch, escapement and age, structure data were compiled by spawning stock and brood year. The history of fishing and management of the runs from inception of the fishery until 1966 is described. Results of the study were used to construct parent-progency relationships that formed the basis for a management strategy to restore the runs to their former level of abundance.

PB80-114606 PC **A02**
Maine Univ., Walpole. Ira C. Darling Center for Research, Teaching and Service.
Bivalve Molluscan Mariculture: A 'Mytilus' Perspective,
Richard A. Lutz. 1978, 17p MSG-TR-40, NOAA-79071303
Grants NOAA-04-6-158-44056, NOAA-04-7-158-44034

Continued growth in the demand for mussels (Mytilus edulis) in the United States will (in the near future) necessitate transforming conditions of supply based on wild harvest to conditions based on mariculture. Mussel cultivation presents an effective means of expanding the resource base, and the accelerated growth and superior quality of cultured mussels make this product an attractive addition to the industry. Experimental and pilot commercial mussel culture systems have been successful in various areas of the United States and continued expansion of mariculture operations

offers the potential for a dependable commercial supply of high quality mussels. Considerable research is required in order to obtain an adequate understanding of the manner in which biological and physical parameters will affect production efficiency of large-scale commercial operations.

PB80-803125 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Shark Behavior and Biology (A Bibliography with Abstracts).
Rept. for 1964-Dec 79,
Elizabeth A. Harrison. Dec 79, 122p
Supersedes NTIS/PS-78/1300, NTIS/PS-77/1183, NTIS/PS-76/0984, and NTIS/PS-75/869.

The citations cover selected abstracts on the biology, ecology, and behavior of sharks. Topics include bioacoustics, locomotor responses, attractants, repellents, and biotelemetry. (This updated bibliography contains 115 abstracts, 8 of which are new entries to the previous edition.)

RERF-TR-1-78 PC **A02**/MF **A01**
Radiation Effects Research Foundation, Nagasaki (Japan). Nagasaki Branch.
Agarose Plate Method for the Study of Human T and B Lymphocyte Migration.
J. A. Pinkston, S. C. Finch, S. Iida, and R. A. Caplan. Jun 78, 10p
Contract EX-76-C-28-3161
In Japanese and English.

An agarose plate method is described for measuring the random migration of human T and B lymphocytes. Migration studies on separate human T and B lymphocyte populations demonstrated striking differences in migration patterns and cell morphologic characteristics. The technique is suitable for studying the effects of chemokinetic and chemotactic factors on the migration of lymphocyte subpopulations. (ERA citation 04:052196)

RERF-TR-8-78 PC **A02**/MF **A01**
Radiation Effects Research Foundation, Hiroshima (Japan).
Chromosome Heteromorphisms in the Japanese. 1. Banding Patterns of Dp+ and Gp+ by Q- and C-Staining Methods.
T. Sofuni, K. Tanabe, and A. A. Awa. Feb 79, 14p
Contract EX-76-C-28-3161
In Japanese and English.

Thirty-four cases with Dp+ amd Gp+, known to be chromosome heteromorphisms in man, were examined using Q- and C-staining methods. Of 18 cases with Dp+, 14 involved No. 15 chromosome and 2 each were No. 13 and No. 14 respectively. Of 16 cases with Gp+, 13 were concerned with No. 22 and the remaining 3 were No. 21. Short arm regions of eight cases with 15p+ and one with 14p+ were stained very darkly by the C-method, but did not fluoresce brilliantly by the Q-method. On the other hand, brightly fluorescing short arm regions observed in three cases with 15p+ and two with 22p+, were not very darkly stained by the C-method. In the remaining 20 cases, short arm regions were not stained positively by either method, but showed negatively or intermediately variable staining intensities. (ERA citation 04:052197)

SAN-0326/33-1 PC **A02**/MF **A01**
Stanford Univ., CA. Dept. of Genetics.
Mutation Rates and Mutational Loads in Man. Annual Progress Report of Scientific Activity.
L. L. Cavalli-Sforza. 1979, 10p
Contract EY-76-S-03-0326-033

Gene frequency maps of the world have been prepared by computer for 39 alleles at nine loci, including HLA genes A and B. Also maps of principal components of gene frequencies have been made, representing overall similarities between aboriginal populations of the world for available genetic markers. A discriminant analysis of the data has indicated some effect of latitude, which is likely to be due to selective effects of climate. (ERA citation 04:052199)

6E. Clinical Medicine

AD-A075 681/7 PC **A03**/MF **A01**
Army (3rd) Fort Mcpherson Ga
First Aid in the Home.
1961, 38p Rept no. PAM-40-1

This booklet is intended as a guide to help you to prevent accidents and to give simple first aid when emergencies do arise.

AD-A075 691/6 PC **A02**/MF **A01**
Army Medical Intelligence and Information Agency Fort Detrick Md
Chronic Edematous Neuritis of the Cornea (Neuritis Edematosa Cronica De La Cornea),
Diego M. Arguello , Bruno Tosi , and Carlos B. Gayoso. 4 Sep 79, 13p Rept no. USAMIIA-HT-007-79
Trans. of Arch. Mem. Soc. Oftal. Litoral 3 p95-104 1950.

No abstract available.

AD-A075 696/5 PC **A02**/MF **A01**
National Naval Dental Center Bethesda Md
Abstracts of Research Project Reports by National Naval Dental Center First, Second, and Third-Year Residents, June 1979.
Final rept. Jul 78-Jun 79,
George B. Pelleu, Jr. 30 Sep 79, 24p Rept no. NNDC-TR-047

These abstracts provide a synopsis of research projects conducted by dental officers enrolled in the first-, second-, and third-year residency programs at the National Naval Dental Center, Bethesda, Maryland, during the academic year 1978-1979. The projects were completed in partial fulfillment of the requirements of the programs. (Author)

AD-A075 753/4 PC **A03**/MF **A01**
Ministry of Defence London (England)
Journal of the Royal Naval Medical Service. Volume 65. Number 1. Spring 1979.
1979, 49p

No abstract available.

AD-A075 821/9 Not available NTIS
Beth Israel Medical Center New York
Experimental Dysbaric Osteonecrosis: Factors Influencing Incidence and Latency,
Chryssanthos P. Chryssanthou. 1974, 6p
Contract N00014-68-A-0393
Availability: Pub. in Underwater Physiology VI, p307-312 (No copies furnished by DTIC).

No abstract available.

AD-A075 869/8 PC **A03**/MF **A01**
Wright Air Development Center Wright-Patterson AFB Oh
The Aeroembolism Problem for Long-Range Missions.
Technical rept.,
Franklin M. Henry. Feb 52, 28p Rept no. WADC-TR-52-84

It can be anticipated that cabin pressure differential will be lost in a significant proportion of high-altitude, long-range bombing operations. In such circumstances, it may be necessary to maintain as high an altitude as is consistent with the limitations imposed by the tendency of personnel to develop incapacitating bends, chokes, or other grave symptoms of decompression sickness (aeroembolism). By breathing undiluted oxygen for several hours under special discipline during the early phase of the flight, at cabin altitudes of the order of 10,000 to 15,000 feet, it is possible to almost completely avoid serious aeroembolism symptoms in later phases that may require cabin altitudes of the order of 35,000 to 38,000 feet, and would otherwise result in 15 to 30% incapacitation. It is shown that the problem becomes particularly acute if all members of the air crew are essential to the mission or to a successful return. Alternative methods of dealing with the situation are considered briefly. (Author)

AD-A075 908/4 PC **A02**/MF **A01**
Walter Reed Army Inst of Research Washington Dc
Antibody-Dependent Cell-Mediated Antibacterial Activity of Human Mononuclear Cells. I. K Lymphocytes and Monocytes are Effective against Meningococci in Cooperation with Human Immune Sera,
George H. Lowell , Lynette F. Smith , Malcolm S. Artenstein , Geoffrey S. Nash , and Richard P. MacDermott, Jr. 5 Mar 79, 13p
Pub. in the Jnl. of Experimental Medicine, v150 p127-137 1979.

No abstract available.

AD-A075 909/2 PC **A02**/MF **A01**
Army Medical Research Unit Kuala Lumpur (Malaysia)
Experimental 'Rickettsia tsutsugamushi' Infections in Dogs,
Akira Shirai , David L. Huxsoll , Richard D. Montrey , Robert M. Werner , and S. Arimbalam. 27 Feb 79, 6p
Grant DAMD17-78-G-9440
Pub. in Japanese Jnl. of Medical Science and Biology, v32 n3 p175-178 Jun 79.

No abstract available.

AD-A075 911/8 PC **A02**/MF **A01**
Walter Reed Army Inst of Research Washington Dc
Coverage of Soft Tissue Defects: A Review,
Alexander M. Guba, Jr. , and John E. Hoopes. 1979, 6p
Pub. in Military Medicine, v144 n10 p655-658 Oct 79.

No abstract available.

AD-A075 915/9 PC **A02**/MF **A01**
Institute for Medical Research Kuala Lumpur (Malaysia)
Persistence and Reactivation of 'Rickettsia tsutsugamushi' Infections in Laboratory Mice,
Akira Shirai , Teik Chye Chan , Elsie Gan , and David L. Huxoll. 27 Feb 79, 8p
Grant DAMD17-78-G-9440
Pub. in Japanese Jnl. of Medical Science and Biology, v32 n3 p179-184 Jun 79.

No abstract available.

AD-A075 924/1 PC **A02**/MF **A01**
Armed Forces Radiobiology Research Inst Bethesda Md
Understanding and Using Statistics in Nuclear Medicine,
Sheldon G. Levin. 12 Feb 79, 11p
Pub. in the Jnl. of Nuclear Medicine, v20 n6 p550-558 Jun 79.

No abstract available.

AD-A075 929/0 PC **A02**/MF **A01**
Walter Reed Army Inst of Research Washington Dc
Measuring the Efficacy of Vaccination in Affording Protection against Plague,
James E. Williams , and Dan C. Cavanaugh. 1979, 7p
Pub. in Bulletin of the World Health Organization, v57 n2 p309-313 1979. Abstract in French.

No abstract available.

AD-A075 931/6 PC **A02**/MF **A01**
National Naval Dental Center Bethesda Md
Effects of Burnishing on Microleakage in an Amalgam System.
Final rept.,
Toby G. Cothren , Earl F. Eschete, Jr. , George B. Pelleu, Jr. , and Jerome J. Rudolph. 1979, 7p
Rept no. NNDC-TR-046
Pub. in The Jnl. of Prosthetic Dentistry, v40 n2 p163-165 Aug 78.

No abstract available.

AD-A075 961/3 PC **A04**/MF **A01**
Public Research Inst Alexandria Va
The Economics of Dental Licensing.
Research contribution,
Arlene Holen. Nov 78, 72p Rept no. CRC-344
Contract PHS-HEW-231-76-0081

With few exceptions, occupational licensing has been viewed by economists as a conspiracy of

suppliers; they have focused attention almost exclusively on its costs, such as higher prices and restricted opportunities to practice. In this study, an attempt is made to define and test for benefits that might flow from dental licensing. In addition, hypotheses about the determinants of licensing stringency are examined and effects of licensing on the distribution of dentists are investigated. The benefits consumers might realize from the licensing of dentists are: (1) reduced risk of adverse outcomes, (2) reduced cost of acquiring information, and (3) greater satisfaction. Whether these benefits are in fact realized by consumers is subjected to several empirical tests. These tests are based on variation between states in the stringency of licensing. Regression analysis is used to distinguish the effects of licensing from other factors. The study concludes that dental licensing may have certain beneficial effects, and that variation in licensing strengency does not appear to create problems of unequal access to care. Since costs are not estimated, however, or even all benefits, judgment as to whether consumers achieve higher levels of welfare because of licensing must await further research. (Author)

AD-A076 006/6 PC **A02**/MF **A01**
Army Research Inst of Environmental Medicine Natick Ma
A Method for the Chronic Cannulation of the Superior Vena Cava and the Aortic Arch in the Rat Using Cannulas Made of Silicone Elastomer Rather than Polyethlene.
Technical rept.,
Candace B. Kelly , Roger W. Hubbard , and Murray P. Hamlet. 17 May 79, 17p Rept no. USARIEM-T-4/79

No abstract available.

AD-A076 223/7 Not available NTIS
Naval Submarine Medical Research Lab Groton Ct
Analysis of Health Data from Ten Years of Polaris Submarine Patrols,
W. A. Tansey , J. M. Wilson , and K. E. Schaefer. 1979, 30p Rept no. NSMRL-815
Availability: Pub. in Undersea Biomedical Research, Submarine Supplement, pS217-S246 1979 (No copies furnished by DTIC).

No abstract available.

AD-A076 224/5 Not available NTIS
Naval Submarine Medical Research Lab Groton Ct
Cardiovascular Risk Factors in Submariners,
D. V. Tappan , L. W. Mooney , M. J. Jacey , and E. Heyder. 1979, 15p Rept no. NSMRL-864
Availability: Pub. in Undersea Biomedical Research, Submarine Supplement, pS201-S215 1979 (No copies furnished by DTIC).

No abstract available.

AD-A076 225/2 Not available NTIS
Naval Submarine Medical Research Lab Groton Ct
Biochemical and Hematologic Profiles of 1000 Submariners,
D. V. Tappan , M. J. Jacey , E. Heyder , and C. A. Harvey. Mar 77, 9p Rept no. NSMRL-849
Availability: Pub. in Undersea Biomedical Research, Submarine Supplement, pS191-S199 1979 (No copies furnished by DTIC).

No abstract available.

AD-A076 227/8 Not available NTIS
Naval Submarine Medical Research Lab Groton Ct
Calcium, Magnesium, and Phosphorus Metabolism, and Parathyroid-Calcitonin Function during Prolonged Exposure to Elevated CO2 Concentrations on Submarines,
A. A. Messier , E. Heyder , W. R. Braithwaite , C. McCluggage , and A. Peck. Dec 75, 14p Rept no. NSMRL-802
Summary in French.
Availability: Pub. in Undersea Biomedical Research Submarine Supplement, pS57-S70 1979 (No copies furnished by DTIC).

No abstract available.

AD-A076 228/6 Not available NTIS
Naval Submarine Medical Research Lab Groton Ct
Effect of Prolonged Exposure to Elevated Carbon Monoxide and Carbon Dioxide Levels on Red Blood Cell Parameters during Submarine Patrols,
A. J. Wilson , and K. E. Schaefer. Dec 75, 8p Rept no. NSMRL-813
Summary in French.
Availability: Pub. in Undersea Biomedical Research, Submarine Supplement, pS49-S56 1979 (No copies furnished by DTIC).

No abstract available.

AD-A076 312/8 PC **A02**/MF **A01**
Army inst of Dental Research Washington D C
Oral Manifestations of Tropical Infectious Diseases of Central and South America. Part II. Bacterial and Mycotic Infections.
Rept. for Feb 78-May 79,
Theodore Zislis , James C. Adrian , and Duane E. Cutright. 24 May 79, 20p
Prepared in cooperation with the Armed Forces Inst. of Pathology, Washington, DC. See also Part 1, AD-A071 007.

Oral manifestations of tropical infectious diseases are seldom discussed extensively in most current textbooks of oral diagnosis or oral pathology. This paper is the result of a survey of literature in which the oral manifestations of infectious diseases of particular significance to Latin America have been described. In addition to emphasizing the oral manifestations, the major clinical and therapeutic aspects of each disease are also discussed in this two-part paper. Part I features protozoal and helminthic diseases and Part II features bacterial and mycotic infections. (Author)

BNL-25810 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Evaluation of Radiolabeled Ruthenium Compounds as Tumor-Localizing Agents.
S. C. Srivastava, P. Richards, G. E. Meinken, P. Som, and H. L. Atkins. 1979, 22p CONF-790321-9
Contract EY-76-C-02-0016
International symposium on radiopharmaceuticals, Seattle, WA, USA, 18 Mar 1979.

This work introduces a new class of radiopharmaceuticals based on ruthenium-97. The excellent physical properties of Ru-97, the high chemical reactivity of Ru, the potential antitumor activity of several Ru coordination compounds, and BLIP production of Ru-97, provide a unique combination for the application of this isotope in nuclear oncology. A systematic study was undertaken on the synthesis, characterization, and evaluation of a number of ruthenium-labeled compounds. In a variety of animal tumor models, several compounds show considerable promise as tumor-localizing agents when compared to gallium-67 citrate. The compounds studied (with Ru in different oxidation states) include ionic Ru, a number of hydrophilic and lipophilic chelates, and various ammine derivatives. (ERA citation 04:052063)

HRP-0026850/8 PC **A03**/MF **A01**
South Carolina Cooperative Health Statistics System, Columbia.
Chiropractors. South Carolina Health Manpower Report.
Jan 78, 36p
Contract PHS-HRA-230-76-0266

Data on South Carolina's chiropractors are provided. In January 1978, South Carolina had 190 active chiropractors, most of whom practiced primarily from private offices; that number is about 5.9 per 100,000 population. The tables also show the number of active chiropractors by: location of practice and age groups; location of practice and total hours worked per week; location of practice and years active; location of practice and principal setting of employment (practitioner's office, chiropractic clinic, school of chiropractic); location of practice and form of employment (solo, contractual agreement, partnership, employed by school of chiropractic); percent of time spent in selected activities (patient care, administration, teaching, research); and by location of school of graduation and year of graduation. A map of South Carolina's health service areas and a copy of the questionnaire used for data collection are provided.

HRP-0027652/7 Not Available NTIS
Rutgers - The State Univ., Newark, NJ. Coll. of Nursing.
Nurses and Behavior Modification – Resistance, Ignorance or Both.
Marilyn Jean Hauser. 1978, 3p
Pub. in Jnl. of Psychiatric Nursing and Mental Health Services v16 n8 p17-19 Aug 78.

The part played by resistance to or ignorance of change in the functioning of staff nurses in a psychiatric therapy milieu that includes teaching is considered, with emphasis on behavior modification. The functions of staff nurses in the psychiatric setting include clinical nursing care, provision of a therapeutic milieu, counseling, symbolic parenting, health teaching, socializing, clinical assistance to personnel, technical aspects, and joint planning with other members of the health care team. Research on behavior modification in general demonstrates the successful application of learning theories to problematic human behavior. Types of problematic behavior are described. A major question relates to what prevents nurses from applying social learning principles which provide a systematic and proven way of changing behavior in patients to achieve desired therapeutic outcomes. Resistance to the adoption of social learning principles may be related to historical trends, to disparate allegiance to physicians, the medical model, institutions, and hospitals, and to fear. Ignorance may be a major factor, since some nurses have successfully utilized behavior modification techniques. Continuing education, inservice education, and the employment of a psychologist for teaching purposes are ways of enhancing behavior modification skills of staff nurses in the psychiatric setting.

HRP-0028061/0 PC **A04**/MF **A01**
Federal Council on the Aging, Washington, DC.
Federal Council on the Aging Annual Report, 1977.
1978, 67p

The Federal Council on Aging's Annual Report to the President – 1977 is presented. A description of the issues confronting the Council is provided, and an explanation of the stand taken by the Council on Federal programs and policies which affect the elderly is supplied. The Council's analysis of the impact of the energy and weather crises on the elderly in 1976 and 1977 is included. Recommendations are made as to the principles which should guide legislative and administrative initiatives for national health care. The necessity of providing the resources necessary for the elderly to remain healthy and independent is emphasized. A discussion of the eight major elements of the Federal Council on Aging's adopted proposals regarding the frail elderly is presented. Personnel needs in the field of aging are explored. An outline is provided of a study on the minority elderly which was initiated in 1977 by the Human Resources Corporation. The Council's Agenda for 1978 includes the following projects: a national policy for the frail elderly; policy considerations of special concerns of the minority elderly; health manpower needs to serve the elderly; and treatment of assets and asset income in determining eligibility for Government programs.

HRP-0028404/2 PC **A02**/MF **A01**
Nebraska State Health Planning and Development Agency, Lincoln.
Care and Feeding of Statewide Health Coordinating Councils – Exercises in Politics, Planning and Public Policy.
Kenneth J. Diamond. 1978, 18p
Presented at the 106th Annual Meeting of the American Public Health Association on Oct 16, 1978.

Parameters that should be considered by persons responsible for the development and delivery of training programs in State health coordinating councils (SHCC's) are examined. A distinction is made between the governing boards of health systems agencies and the roles and functions of SHCC's. The functions of SHCC's are clearly delineated by the National Health Planning and Resources Development Act of 1974, and as more State health plans near completion and adoption, the training and orientation needs of SHCC's are significant. Categories of educational programs for

SHCC's include consumer programs, an approach that attempts to teach individuals about priority setting, an approach that focuses on decisionmaking and different strategies to employ in reaching consensus, and the delineation of board-staff relationships. Planning and policymaking functions are the responsibility of SHCC's, and training programs must address both these functions. It is essential that SHCC's understand their relationship to other agencies in State government to achieve their goals. Issues for possible inclusion in SHCC training programs are noted. References are included.

HRP-0029159/1 PC **A05**/MF **A01**
TAC/X Center for Health Planning, Boise, ID.
National Guidelines for Health Planning.
Final rept.
1978, 96p
Contract PHS-HRA-232-78-0121
Conference held October 27-28, 1978.

This conference was held in 1978 by the Center for Health Planning in Boise, Idaho, to address significant issues in the development of national guidelines for health planning. Presentations specifically dealt with standards for inpatient services, standards for special services, regional perspectives on national guidelines, the impact of national guidelines on the health care system, adjustment of inpatient standards, and adjustment of special service standards. The implications of national health planning guidelines and Federal concerns were analyzed, as well as the standards adjustment process and individual health planning agency problems. Conference participants determined that national health planning guidelines are a necessary administrative step in the context of knowledge advancement and the political environment, that common sense is an adequate rule to apply in judging the adequacy of a health systems agency's treatment of national guidelines, and that adjustment methods for hospital occupancy rates are necessary because occupancy rates in national guidelines are generally difficult to implement. State groups made reports at the conference, and consultations with individual planning agencies regarding the adjustment process were held.

HRP-0029557/6 PC **A06**/MF **A01**
Indian Health Service, Rockville, MD.
Indian Health Trends and Services.
1978, 103p DHEW/PUB/HSA-78/12009

Current and trend information on the demographic characteristics and health status of American Indians and Alaska Natives is presented. The book contains vital event data complete through calendar year 1975, notifiable disease data complete through calendar year 1976, and program data complete through fiscal year 1976. The health categories include natality (birth rate, fertility rate, low-birth-weight babies, and births in hospitals), infant and maternal mortality (causes of infant death, neonatal deaths, postneonatal deaths, sudden infant deaths, gastroenteric infant deaths), general mortality (both age-adjusted and age-specific, accidents, diseases of the heart, cerebrovascular diseases, malignant neoplasms, influenza and pneumonia, diabetes mellitus, bronchitis, emphysema, asthma, suicide, homicide, alcoholism and cirrhosis of the liver, tuberculosis, and gastroenteric deaths), and notifiable diseases (otitis media, gastroenteritis, streptococcal sore throat, influenza and pneumonia, venereal diseases, trachoma and tuberculosis). Additional sections provide information on hospital utilization, the number of health workers (physicians, nurses, and dentists), family planning, and pharmacy services. The book includes 13 figures and 65 tables.

HRP-0029701/0 PC **A02**/MF **A01**
Northern Indiana Health Systems Agency, Inc., South Bend.
National Health Insurance -- Messiah or Boondoggle.
David Vrbanich. Feb 79, 15p

A macroscopic overview of the issue of national health insurance is provided. Questions which must be answered before the implementation of national health insurance are delineated. Concerns include the level of health insurance that should be offered to the population and whether the public or private sector should implement and regulate the national health insurance plan. The private sector's failure to provide responsible leadership in allocating health resources is noted, as is its lack of desire or ability to control costs and utilization of services. The possibility of a joint partnership of consumers and health care providers is noted. Overviews are presented of the Kennedy plan, the American Hospital Association plan, the American Medical Association plan, and the Carter plan. Descriptions are provided of the Canadian National Health Insurance plan and the British National Health Service. Tables illustrate the data provided and a chart reveals private and public health expenditures from 1929 to 1975. Predictions as to the future of health care in America are supplied.

HRP-0029710/1 PC **A14**/MF **A01**
National Heart and Lung Inst., Bethesda, MD. Office of Prevention, Control and Education.
Proceedings of the National Heart and Lung Institute Working Conference on Health Behavior Held at Basye, Virginia on May 12-15, 1975.
Stephen M. Weiss. 1977, 307p DHEW/PUB/NIH-77/868

A conference was convened by the National Heart and Lung Institute in 1975 to provide substantive information to the institute from the behavioral and social science community on health behavior problems related to the prevention and control of heart, lung, and blood disorders. Other objectives of the conference were to provide an opportunity for behavioral and social scientists to become familiar with health behavior problems inherent in heart, lung, and blood disorders and to aid in the continuing process of making behavioral and biomedical scientists aware of contributions they can make toward problem resolution. Thematic sessions and task group sessions comprised the major part of the conference and focused on diseases and disease prevention. The following topics were covered: behavioral medicine as a new frontier (opportunities and dangers); lifestyle development versus modification; individual responsibility for health maintenance; psychosocial determinants of health and illness; psychosocial consequences of illness; ethnical concerns regarding health behavior; compliance, recruitment, and coping; and specific diseases (atherosclerosis, cardiac rehabilitation, chronic pulmonary disease, and hypertension). Preconference materials are appended.

HRP-0029848/9 PC **A02**/MF **A01**
Boston Univ., MA. Center for Health Planning.
Planning for Health Status and Prevention -- A Critique.
Robert Bradbury. 1979, 25p
Contract PHS-HRA-232-78-0108

Recommended actions, resource requirements, and implementation strategies associated with health status problem identification, definitions of health, and health status indicators and mortality and morbidity data are analyzed. The purpose of the report is to offer guidance to New England health systems agencies (HSA's) and State health planning and development agencies in their planning for health status and prevention services and is based on a critical examination of health systems plans (HSP's) developed by 12 agencies. It is important that priority be given to the provision of services to persons who will benefit most from them, and that the occurrence of a disease or condition in the population be compared to some acceptable standard. In evaluating health status goals, goal levels, and objective statements of HSA's, specific diseases should be addressed and emphasis should be placed on diseases that are amenable to intervention. Furthermore, target populations (populations at risk) should be well-defined, and goals and objectives should be stated in health status terms as much as possible. Objectives should be time-related and priorities should be established. Recommended actions, resource requirements, and implementation strategies are presented for consideration in content development for HSP's.

HRP-0029855/4 PC **A02**/MF **A01**
Boston Univ., MA. Center for Health Planning.
General Review of Health Services Cost Analysis in Health Systems Plans.
Mike Pepper. 1978, 12p

Health systems agencies (HSA's) that have included cost containment issues in their health systems plans and annual implementation plans are examined. Documents of HSA's were evaluated as to whether they contributed to cost containment in one or more of the following areas: (1) general discussion of health care cost issues supported by unusual or extensive bibliographic citations; (2) gathering and/or generating cost data; (3) performing cost-benefit analysis or otherwise assessing the cost impact of alternative programs; and (4) unusual or well-planned programs for controlling costs. Plans in Alaska, Massachusetts, Arkansas, Florida, Connecticut, Indiana, Maryland, Georgia, and Illinois are reviewed. An appendix lists HSA's whose 28 documents were examined.

HRP-0029987/5 Not Available NTIS
Methodist Hospital, Madison, WI.
Informed Consent -- A Patient's Right.
Linda Briggs Besch. Jan 79, 4p
Pub. in Nursing Outlook v27 n1 p32-35 Jan 79.

Difficulties associated with the doctrine of informed consent as a patient's right are noted. Of particular importance to nurses is the information that patients need to make rational decisions. DHEW regulations stipulate that a patient's informed consent must be obtained before a physician implements any form of therapeutic intervention. Patients' rights established in the doctrine of informed consent have implications for members of the nursing profession, both collectively and individually. Numerous court cases have led to the existing principle of informed consent which holds that a physician must disclose all information needed by a reasonable person to make an intelligent decision regarding proposed therapy. Essential elements of an informed consent procedure are explanation of the proposed treatment and inherent risks and benefits, alternatives to the proposed treatment, adequate time for patients' questions, and the option to withdraw at any time. There are three primary areas of difficulty in obtaining a meaningful informed consent from patients: (1) who gives the information; (2) what information should be disclosed; and (3) where information is given. Obtaining a meaningful informed consent involves a commitment to and a belief in patients' rights. The nursing profession must examine its values concerning patients' rights, after careful consideration of alternatives to and consequences of adopting such values.

HRP-0029989/1 Not Available NTIS
Bay General Community Hospital, Chula Vista, CA.
Joint Nursing-Pharmacy Program Helps Reduce Medication Errors.
Shirley Walters, Donis Barker, and CeCe Wilkens. 16 Mar 79, 3p
Pub. in Hospitals, Jnl. of the American Hospital Association v53 n6 p141, 143-144 16 Mar 79.

Nursing and pharmacy department staff members at Bay General Community Hospital in Chula Vista, Calif., collaborated in a program to reduce medication errors. The cooperative program was implemented after primary nursing had been established throughout the hospital in 1977. With primary nursing, the probability that errors will occur is increased and more nurses notice and report errors. The first step taken in developing the program to minimize medication errors was to revise written procedures for handling such errors through corrective action. Corrective action is initiated for the nurse who made the error. A medication error report is completed by the responsible nurse and supervisor within 24 hours after an error occurs. The supervisor counsels the nurse and makes appropriate recommendations for action. Corrective action may include, in addition to counseling, remedial action by the inservice education department, monitoring, or dismissal. Medication reminder cards are employed to help eliminate errors of omission. A computer system has been implemented by the hospital that links nursing units and ancillary services. The pharmacy computer can thus provide a complete medication profile for each patient. The results of monthly audits of medication and other treatment errors demonstrate the program's success in reducing medication errors. A sample nursing medication error interview and medication reminder card forms are included.

HRP-0030004/6 Not Available NTIS
Saint Mary's Hospital, Galesburg, IL.

Responsibility and Authority Must Match in Nursing Management.
Richard D. Adkins. 1 Feb 79, 3p
Pub. in Hospitals, Jnl. of the American Hospital Association v53 n3 p69-71 1 Feb 79.

The delegation of responsibility in nursing management is examined in relation to the need for responsiveness to operational and personnel problems in the health care industry. Nursing management systems have been developed that range from systems where non-nursing personnel manage a unit or group of nursing units to elaborate systems where traditional head nurses manage only personnel and functions directly related to patient care while other managers handle supply, linen control, and other non-nursing functions. One problem with most nursing management systems is that they fail to delegate authority to various nursing managers who have responsibility for the supervision of nursing units. In any management structure, delegated authority must be commensurate with delegated responsibility. The delegation-of-authority approach in the hospital environment helps to assure that nurse managers can fulfill their responsibilities. It has changed the role of nurse managers at all levels and has provided a system that is highly responsive to operational and personnel problems. The development of an improved nursing management structure at St. Mary's Hospital in Galesburg, Ill., in which the goal was to design a system providing high quality care in a financially viable manner and to meet the needs and concerns of employees in order to minimize unionization attempts, is detailed.

HRP-0030005/3 Not Available NTIS
Visiting Nurse Association of Johnson County, Iowa City, IA.
Signed Consent -- Protection or Constraint.
Kathleen Kelly, and Eleanor McClelland. Jan 79, 3p
Pub. in Nursing Outlook v27 n1 p40-42 Jan 79.

The willingness of elderly patients to sign consent forms for treatment was investigated. Emphasis was on the characteristics of persons in two different posthospital care settings: those referred to nursing homes after hospitalization and those referred for home health care. The basic problem was in obtaining signed consents. Of 67 eligible persons asked to participate, only 44 gave written consent. Of the 23 persons who refused, 17 said they did not want to participate in the referral process and 6 indicated they wanted to participate without signed consent. An effort was made to deal with the lack of knowledge about signed consent, to minimize the threat of personal questions, and to minimize psychosocial barriers. The most effective method was for the subject to sign a prepared statement after receiving written or verbal explanation. This procedure, even though intended to protect patients' rights and essential to ethical research, was in itself a constraining force. Technical language and the formality of providing forms appeared to contribute to subjects' refusal to participate. Four recommendations are offered: (1) signed consent to participate should be obtained by a person well known to the subject; (2) the subject should be protected from external distractions and peer group pressure; (3) the subject should be approached at a time that does not conflict with established routines; and (4) the use of verbal tape-recorded consent should be used as a legitimate substitute for signed consent. Sample consent forms are included.

HRP-0030043/4 Not Available NTIS
New Orleans Univ., LA. School of Nursing.
Toward a Realistic Strategy for 1985.
Enrica Singleton. May 79, 4p
Pub. in RN v42 n5 p95-96, 98, 100 May 79.

This paper outlines a strategy to gain grass roots support for a proposal to implement two levels of nursing practice by 1985. The American Nurses' Association (ANA) proposes two levels of nursing practice by 1985 (professional and technical nurses). Many nursing leaders are in favor of this proposal, even though they acknowledge tactical weaknesses and implementation problems. To solve some problems, 10 steps to be taken by the ANA are specified: (1) define overall needs and goals; (2) define problems; (3) identify constraints, capabilities, resources, and claimant groups; (4) indicate an approach to solving problems; (5) state objectives; (6) list alternatives; (7) analyze options; (8) apply decision rules to make choices; (9) control and implement decision actions; and (10) evaluate the effectiveness of decisions. Areas of action to be pursued by the ANA concern the support of definitive clinical laboratory experiences, the provision of evidence that nurse graduates are sufficiently competent in professional or technical areas, the definition of positions where technical competence is not essential to nursing practice, and the establishment of innovative continuing education programs.

HRP-0030044/2 Not Available NTIS
You Really Are Underpaid.
Vincent O'Neal. May 79, 4p
Pub. in RN v42 n5 p79-80, 82, 88 May 79.

Women, including approximately 6,000 nurses, are compared with men in terms of duties and salaries. A project initiated by the Washington State Employees System evaluated more than 90 different positions with regard to the job skills and wage rates of women and men. In general, womens' jobs paid 20 percent less. Nurses were among the hardest hit. In comparison with safety inspectors (primarily men) who received a median pay of $19,100, nurses were paid a median of $13,800 per year. The value of a nurse's job is viewed as comparable to that of a midlevel professional, even though pay rates are equivalent to those for maintenance personnel. Several litigation cases have been unsuccessful in obtaining adequate pay for women. The Federal Equal Employment Opportunities Commission (EEOC), however, has been a major factor in the legal sector to bar employment discrimination of any kind. The slogan of the EEOC during its first 10 years of operation was 'equal pay for equal work'. Job evaluation seems to be the key in EEOC and other efforts to treat women and men equally.

HRP-0900547/1 PC **A04**/MF **A01**
Rhode Island State Nurses' Association, Providence.
Analysis and Planning for Improved Distribution of Nursing Personnel and Services in Rhode Island.
Sep 77, 66p

The report presents the results of work performed by the Task Force for the Rhode Island Analysis and Planning Project for Improved Distribution of Nursing Personnel and Services. The goals of the task force were to examine the existing utilization and distribution of nursing in the State and to project nursing requirements and resources for the next 5 years. The State model was designed to forecast estimates of required nursing personnel and nursing resources for the next five years, based on user-specific assumptions. Four major health-care services categories were considered: inpatient, ambulatory care, emergency, and outreach. General considerations, assumptions, and rationales forming the basis of the projections are presented. Data are presented on the personnel requirements projections for 1981, based on the assumptions discussed. The model projects the number of nursing personnel by category (registered nurses, licensed practical nurse/nurses' aide); by employment setting; by position; and by educational preparation (registered nurses only). Resources projections incorporate factors that influence production of nurses, work force participation, and migration patterns. Limitations related to the application of the projections are discussed. Recommendations are made regarding the utilization of the State model and future research in the area of nursing personnel planning.

HRP-0900556/2 PC **A11**/MF **A01**
Western Interstate Commission for Higher Education, Boulder, CO.
Analysis and Planning for Improved Distribution of Nursing Personnel and Services.
Final rept.,
Jo Eleanor Elliott, and Jeanne M. Kearns. 1978, 227p

This project of the Western Interstate Commission for Higher Education (WICHE) was conducted to strengthen on a national scale the nursing community's ability to analyze and to plan for the appropriate distribution of nurses and services. The project covered the 1975-1977 period during which consideration was given to the development of analytical models, data collection planning procedures, approaches for improving the distribution and delivery of care, and knowledge of and participation in health planning. Various committees and task forces were established to address project issues, and a national panel of expert consultants was convened to project nursing requirements at national and State levels. WICHE staff scheduled workshops on a periodic basis to explore issues of concern and to develop work plans. Outcomes of the project included a State model, a national model, data base and profile reports, a taxonomy, regional centers for increasing the knowledge and participation of nurses involved in health planning, training, national conferences, and evaluation. The State model projects nursing requirements over a 5-year period, and the national model over a 20-year period. Profile reports developed for States contain data necessary for the modeling process. The taxonomy is intended to standardize nursing practice descriptors. Resources and publications are noted, and the impact of the project is discussed. Tables and figures are included.

HRP-0901445/7 PC **A99**/MF **A01**
Alameda-Contra Costa Health Systems Agency, Oakland, CA.
Health Systems Plan for 1979-1983. Health Service Area 5 California.
1979, 923p
See also AIP, HRP-0901446, HSP Summary, HRP-0901447.

The first section of this health systems plan (HSP) provides information about the organization of the plan, history and legal aspects of health planning, a descriptive model of the health care system, and a health service area profile. Next follows a brief summary of HSP goals and objectives. The priority goals relate to infant mortality, regionalized perinatal services, family planning and counseling services, health information and education services, prevention services, short-stay inpatient mental health services, home health care and therapy services, and improvement of financial and coverage aspects of the current delivery system. The health maintenance concept section deals with: the Health Field Concept, with attention to lifestyle, environment, environmental quality management, and human biology; health promotion and protection services; prevention and detection services; and maintenance services. The final two sections cover diagnosis and treatment (medical surgical services, skilled nursing and intermediate care, pediatric services, emergency medical services, acute psychiatric services, and habilitation and rehabilitation services) and support systems. A glossary, maps, inventories, and related information are appended. Portions of this document are not fully legible.

HRP-0901446/5 PC **A04**/MF **A01**
Alameda-Contra Costa Health Systems Agency, Oakland, CA.
Annual Implementation Plan for 1979. Health Service Area 5 California.
1979, 66p
See also HSP, HRP-0901445, HSP Summary, HRP-0901447.

This annual implementation plan (AIP) is intended to bring about changes in the health systems serving health service area residents to improve their health status. The introductory material covers the agency's authority, responsibility, and organization, the purpose and limitations of the AIP; determination of AIP goals; development, review, and update of the AIP; the plan format; cost containment considerations; and future planning. The remainder of the document is devoted to charts showing the ranking form for health care priority goals, the schedule for developing a cost/benefit analysis of the AIP goals selected, and the AIP goals and objectives themselves. These goals relate to: health prevention, information, and education services; family planning education and counseling services; infant mortality and regionalized perinatal services; primary care; and home health services. For each goal, the format encompasses the following elements: the health systems plan goal; AIP objectives; the rationale; a priority rating; recommended actions; alternatives and settings considered; a cost-benefit analysis; and resources required.

HRP-0901447/3 PC **A04**/MF **A01**
Alameda-Contra Costa Health Systems Agency, Oakland, CA.
Health Systems Plan for 1979-1983. Health Service Area 5 California.
Summary rept.
1979, 75p
See also HSP, HRP-0901445, AIP, HRP-0901226.

This health systems plan summary states the agency's mission and function and the major findings of the plan; provides a convenient source of information on health status, problems, and systems in Alameda and Contra Costa Counties; defines common terms and titles used in the planning process; and serves as a guide in understanding national, State, and local health priorities. Following the introductory material, which explains the scope and depth of the summary, the functions of the agency, and the purpose and development of the health systems plan, the health care priorities are outlined. The priority goals relate to infant mortality, regionalized perinatal services, family planning and counseling services, reduction of gonorrhea and syphillis incidence, minimization of heart and circulatory diseases, health information and education services, increased development of and emphasis on prevention services, availability and accessibility of short-stay inpatient mental health services, home health care and therapy services, and improvement of financial and coverage aspects of the current delivery system. The final sections contain the health service area profile, a discussion of the components of the plan, and a glossary of terms.

HRP-0901511/6 PC **A06**/MF **A01**
Bureau of Health Manpower, Hyattsville, MD. Div. of Dentistry.
Survey of Dental Benefit Plans, 1973.
1979, 102p DHEW/PUB/HRA-79/29

This publication contains data gathered at the end of 1973 during a survey designed to assess the status of dental prepayment. A total of 10,654 questionnaires were mailed to organizations with an indicated involvement in prepaid dental programs for their employees or members; 5,501 usable responses were received. For the purposes of the survey, a prepaid dental benefit plan was defined as a program in which periodic, specified payments are made in advance and used to pay for any required dental services. Arrangements in which the sponsor provides direct care through in-plant facilities and programs in which the sponsor pays for care without contracting with an insurer for coverage are also included. The report presents characteristics of dental benefit plans, a summary of the survey findings, and a more detailed discussion of the characteristics of plans as reported by respondents and of the interrelationship of these characteristics. The characteristics of dental plans covered include the locations and sponsors, changes over time, size, underwriters, the source of income, the scope of benefits, eligibility requirements, cost-sharing provisions, the option of employees to participate, and incentives. Information on the survey methodology and questionnaire, and a glossary are appended. Extensive tables present dental plan characteristics.

HRP-0901546/2 PC **A05**/MF **A01**
Piedmont Health Systems Agency, Inc., Greensboro, NC.
Annual Implementation Plan for 1979-1980. Health Service Area 2 North Carolina.
1979, 89p
See also HSP, HRP-0901545.

This annual implementation plan (AIP) opens with an introduction that covers the purpose and scope of health planning, AIP objectives derived from broad goal areas stipulated in the health systems plan, and the AIP development process. The goal areas of the health systems plan involve health education, nutrition, family planning, dental care, primary health care, alcoholism, child care, acute care, long-term care, discharge planning, and health care costs. A prioritized list of AIP objectives is presented that was devised on the basis of six criteria: costs and benefits, unique needs of the health service area, diagnosis and treatment services, health system impact, feasibility, and health improvement. AIP objectives and action statements are presented for: prevention (health education, nutrition, family planning, and dental health); diagnosis and treatment (primary care, alcoholism, child health, and acute care); long-term care; discharge planning; and health care costs. Procedures for the review and amendment of the AIP and a summary of the previous AIP's evaluation are appended.

HRP-0901603/1 PC **A05**/MF **A01**
Mid-Louisiana Health Systems Agency, Baton Rouge.
Areawide Plan for Perinatal Care for 1979. Health Service Area 2 Louisiana.
1979, 77p
See also HSP/AIP, HRP-0901605, Areawide Plan for General Medical Services, HRP-0901604, Areawide Plan for Pediatric Services, HRP-0901625.

Quality perinatal services, directed toward assuring the health of both mothers and infants and providing family education, are defined as: (1) prenatal phase, where preventive, diagnostic, and treatment services are rendered; (2) labor and delivery phase, where services such as fetal monitoring, anesthesia, Caesarean sections, and induction-stimulation of labor are provided; and (3) postnatal phase. Analyses of the population and health status (crude birth rates, fertility rates, legitimacy status, birth weights, maternal mortality, fetal deaths, perinatal deaths, neonatal mortality, and infant mortality) are presented. The primary health status goal is to reduce the incidence of preventable health factors leading to high-risk pregnancy and delivery among women. The health care delivery system is examined in relation to national health planning guidelines and in terms of the availability of perinatal services (manpower, ambulatory facilities, short-stay inpatient facilities, and services), accessibility, acceptability, quality, continuity, and cost. The major health system goal is to develop a coordinated system of perinatal care services consistent with maternal and infant needs. Standards and criteria for the provision of various levels of perinatal services are noted in tabular form.

HRP-0901604/9 PC **A03**/MF **A01**
Mid-Louisiana Health Systems Agency, Baton Rouge.
Areawide Plan for General Medical Services for 1979. Health Service Area 2 Louisiana.
1979, 48p
See also HSP/AIP, HRP-0901605, Areawide Plan for Pediatric Services, HRP-0901625, Areawide Plan for Perinatal Care, HRP-0901603.

This service-specific areawide plan opens with a description of general medical services, including primary, secondary, and tertiary inpatient and outpatient services. Population analysis provides information on subgroups that can be labeled high risk with regard to general medical services, including: nonwhites; males; persons in rural areas, 65 years of age and older, and of low socioeconomic status; and residents of high population density areas. The analysis of health status focuses on crude mortality rates, proportional mortality rates, productive years of life lost, and the identification of health status problem areas. Goals for health status, with accompanying objectives, are to reduce the average annual mortality rate due to heart disease, cancer, cerebrovascular disease, accidents, and influenza and pneumonia. The assessment of the health system covers occupancy rates of general hospitals, inpatient services, the availability of trained personnel, and the physician supply. The main health system goal is to make general medical services more accessible, with consideration given to cost containment, the prevention of service duplication, and underutilization of resources.

HRP-0901605/6 PC **A08**/MF **A01**
Mid-Louisiana Health Systems Agency, Baton Rouge.
Health Systems Plan for 1979 and Annual Implementation Plan for 1979. Health Service Area 2 Louisiana. 2nd Edition.
1979, 168p
Grant PHS-06-P-000200-03
See also Areawide Plan for Pediatric Services, HRP-0901625, Areawide Plan for General Medical Services, HRP-0901604, Areawide Plan for Perinatal Care, HRP-0901603.

Introductory materials in the Mid-Louisiana health systems plan (HSP) concern the statutory authority for health planning, the history and responsibilities of the health systems agency, and HSP development. An overview of the health service area describes geographic, demographic, and socioeconomic characteristics and health system resources. Health status is examined. The health system analysis encompasses health planning priorities, the structure of the health system, and community health promotion and protection services. Five cycles are identified for further exploration: (1) promotion of wellness, health education and referral, emergency medical care, substance abuse, and services to the disabled; (2) perinatal care, general medical care, and pediatric care; (3) health and health-related concerns of the elderly and services for persons with heart disease; (4) services for persons with cancer and diagnostic radiology; and (5) end-stage renal disease services. After introductory comments about the annual implementation plan (AIP), areas of priority in the AIP are identified: health education and information, promotion of wellness, perinatal services, alternatives to long-term care for the terminally ill, services to the developmentally disabled, emergency medical care, and general medical care.

HRP-0901607/2 PC **A03**/MF **A01**
Health Systems Agency of Northeast Pennsylvania, Avoca.
Annual Implementation Plan for 1979-1980. Health Service Area 3 Pennsylvania.
27 Feb 79, 50p
Grant PHS-03-P-001417-03
See also HSP, HRP-0901608.

The concern of the introductory section of the annual implementation plan (AIP) for Northeast Pennsylvania is with the relationship between recommended actions and priorities contained in both the AIP and the health systems plan. Areas of priority in the AIP include protection (environmental management -- water quality), health promotion (school health education, patient education and patients' rights, and community health education, occupational health, mental health promotion, and family life education), prevention and detection (immunizations, preventive dental health, family planning, prenatal care, nutrition, and condition-specific screening), diagnosis and treatment (obstetrics and neonatal intensive care, surgical services, diagnostic radiology, and general medical services), habilitation and rehabilitation (nursing services), and health system enabling services (planning and resource development with regard to manpower and facilities). Notes on the process of amending the AIP and the health systems plan are included.

HRP-0901608/0 PC **A23**/MF **A01**
Health Systems Agency of Northeast Pennsylvania, Avoca.
Health Systems Plan for 1979-1980. Health Service Area 3 Pennsylvania, 2nd Edition.
27 Feb 79, 535p
Grant PHS-03-P-001417-03
See also AIP, HRP-0901607.

The introduction to this health systems plan (HSP) addresses the organization of the health systems agency, the scope of the HSP, the planning process and participation, the regional profile, and procedures for amending the HSP and the annual implementation plan. Health status indicators are assessed, including family life, immunizations, preventive dental health, nutrition, infant morbidity and mortality, and condition-specific screening (heart disease, kidney disease, cerebrovascular disease, hypertension, cancer, diabetes, and glaucoma). The health system is evaluated in terms of promotion and protection, prevention and detection, diagnosis and treatment (obstetrics and neonatal intensive care, pediatrics, surgical services, radiation therapy, diagnostic radiology, emergency medical services, dental health, mental health, substance abuse, and general medical services), habilitation and rehabilitation, maintenance (end-stage renal disease), and health system enabling services (planning and resource development for manpower, facilities, and equipment). A technical appendix provides additional information on elements on the HSP. Portions of this document are not fully legible.

HRP-0901612/2 PC **A06**/MF **A01**
Health Planning and Resources Development Association of Central Ohio River Valley, Cincinnati.
Annual Implementation Plan for 1978. Health Service Area 1 Ohio.
Feb 78, 109p
Grant PHS-05-P-000238-02/BP-P24
See also HSP, HRP-0901613.

The annual implementation plan (AIP) incorporates seven mandated functions: (1) development of specific plans for achieving AIP objectives; (2) provision of technical assistance to improve the health system; (3) award of grants or contracts from the Area Health Services Development Fund; (4) review of proposed uses of certain Federal funds within the health service area; (5) review of the need for proposed new institutional health services; (6) review of the appropriateness of all institutional health services available; and (7) recommendations for the modernization, construction, and conversion of medical facilities. The AIP's scope and previous year's status, as well as goals and objectives in the health systems plan considered for AIP inclusion are addressed. Short-range objectives, actions, and resource requirements are indicated for the following areas: reduction in infant mortality, health education coordination; inpatient and ambulatory needs; clinical patterns of care; pediatric units and bed supply; a seminar on the workload recording system of the College of American Pathologists; acute inpatient primary service area determination; recruitment of primary care physicians; hemodialysis stations; and seminar on home health evaluations. An appendix describes the process for meeting Federal requirements associated with AIP development.

HRP-0901618/9 PC **A11**/MF **A01**
Health Systems Agency of Southeast Kansas, Inc., Wichita.
Health Systems Plan for 1978. Health Service Area 3 Kansas. 2nd Edition.
Dec 78, 227p
See also Hospital Bed Need Plan, HRP-0901619, Computerized Tomography Scanning Plan, HRP-0901620, Hospital Obstetrics Service Plan, HRP-0901621, AIP, HRP-0901622.

The health systems plan (HSP) for Southeast Kansas explains the mission of the health systems agency, procedures for revising the HSP, the implementation of the agency's goals and objectives, and health status and health system issues. Seven major health status problem areas, based on local incidence rates, include: chronic diseases, gonorrhea, accidental deaths, conditions at birth and in early infancy, mental illness and alcohol and drug abuse, dental diseases, and immunizable diseases. The health system is analyzed regarding: promotion, prevention, and detection--immunization, screening, and maternal and child health services; diagnosis and treatment -- primary care, acute care hospital, hospital obstetric, computerized tomographic scanning, community mental health, and emergency medical services; and habilitation, rehabilitation, and maintenance -- home health services, long-term institutional care, and substance abuse services. Goals, objectives, recommended actions, and resource requirements for health status and health system issues are enumerated. Priorities and areas for further consideration are noted. A glossary of terms is provided.

HRP-0901619/7 PC **A02**/MF **A01**
Health Systems Agency of Southeast Kansas, Inc., Wichita.
Hospital Bed Need Plan for 1978. Health Service Area 3 Kansas.
Dec 78, 21p
See also HSP, HRP-0901618, Computerized Tomography Scanning Plan, HRP-0901620, Hospital Obstetrics Service Plan, HRP-0901621, AIP, HRP-0901622.

This hospital bed need plan for Southeast Kansas categorizes three types of hospital bed capacity: (1) designed bed capacity; (2) usable bed capacity; and (3) staffed bed capacity. An assessment of needs and problems in the health service area indicates adequacy of short-stay, non-Federal acute care hospital beds. The aim is to contain increases in community expenditures for hospital services while assuring 45-minute driving time accessibility to quality hospital care for all. Indicators that can be used, in addition to beds, are patient days and occupancy rates. Recommended actions pertain to criteria and standards for facility modernization/replacement, appropriateness review procedures, professional standards review organizations, hospital service areas, alternative cost-effective uses for underutilized capacity, incentives to convert underutilized capacity to better uses, models for the delivery of diagnosis and treatment services on an outpatient basis, improved data collection activities, continuing education programs for hospital staff and consumers, multihospital planning activities, coordination of long-range institutional plans, and resolution of Medicare reimbursement problems. Data on acute care services are provided in appendixes, as well as a map of short-stay hospitals.

HRP-0901620/5 PC **A02**/MF **A01**
Health Systems Agency of Southeast Kansas, Inc., Wichita.
Computerized Tomographic Scanning Service Plan for 1978. Health Service Area 3 Kansas.
Nov 78, 25p
See also HSP, HRP-0901618, Hospital Bed Need Plan, HRP-0901619, Hospital Obstetrics Service Plan, HRP-0901621, AIP, HRP-0901622.

This plan indicates that computerized tomographic (CT) scanning services are available to residents of Southeast Kansas but that standards should be implemented to guide the review of the new CT proposals. CT services (head and body scanning) are generally found in major tertiary care referral hospitals. Primary indicators to use in ascertaining the accessibility of CT services in the health service area are waiting periods involved in receiving CT services. The cost factor in service delivery relates directly to the health systems agency's mission of restraining increases in the cost of providing health care and preventing unnecessary duplication of health resources. Levels at which CT services should be provided are stated for head scanners and whole body scanners. The basic goal of the CT scanning service plan is to assure that residents of the health service area have reasonable access to such service while discouraging unjustified proliferation of costly equipment. By 1980, all CT scanning equipment purchasers must obtain a certificate of need prior to acquisition. Appendixes provide additional information on the availability of CT scanners in Southeast Kansas. A glossary of terms is provided.

HRP-0901691/6 PC **A02**/MF **A01**
Bureau of Health Manpower, Hyattsville, MD.
Physician Capacity Utilization Surveys -- Project Summary.
Oct 78, 20p DHEW/PUB/HRA-79/17

A summary of DHEW-sponsored primary care physician utilization surveys is provided in this report. The surveys were conducted by telephone to evaluate physicians in general and family practice, internal medicine, and pediatrics. They covered the 1973-1975 period and included 219 large and small standard metropolitan statistical areas, as well as nonmetropolitan areas in the 1973-1974 surveys, and 269 similar areas in the 1975 resurvey. In all surveys, there were approximately 16,000 observations on individual medical practices. The primary goal of the 1973-1974 surveys was to ascertain the response of physicians to market conditions. The resurvey in 1975 was conducted to provide a longitudinal data base to evaluate physicians' responses to substantial shifts in the demand for their services. The supply response of physicians was examined in 1975 by identifying changes in the intensity of demand and the ways that physicians altered the organization of their practices in response. Products of the three surveys are a methodology to evaluate access to medical care and analyses of physicians' market behavior. Specific areas of concern in the surveys are the number of aides employed, characteristics of office practice, patient loads of recently graduated physicians under varying levels of market tightness, and physicians' acceptance of Medicaid patients.

HRP-0901692/4 PC **A13**/MF **A01**
Mathematica Policy Research, Inc., Washington, DC.
Physician Capacity Utilization Surveys.
1979, 279p DHEW/PUB/HRA-79/31
Contract PHS-HRA-231-75-0023

The results of a national telephone survey of physician capacity utilization are presented. The national survey program was part of a growing effort to analyze the market for physicians' services. Initial surveys were conducted in 1973 and 1974, and a resurvey was initiated in 1975. Objectives of the resurvey were to provide a longitudinal data base for further evaluation of the response to shifts in the demand for physicians' services and to expand the coverage in nonmetropolitan areas. A questionnaire was administered to the offices of 9,000 primary physicians included in the 1973 and 1974 surveys and to 50 new nonmetropolitan sampling units. The final sample included 5,661 resurveyed physicians. Data obtained were evaluated in terms of impediments to access, inputs to physicians' practices, outputs, and proportion of Medicaid and Medicare patients. Substantial regional differences in access were observed, and there was a certain amount of urban concentration in productivity. Access was the result, at least in part, of compensating behavior in areas of lower medical manpower. A trend toward reduced patient visits, possibly due to a shift in patient mix emphasizing more complex cases, was noted, but the precise effect on physicians' gross revenue was not clear. Physicians in localities with fixed fee Medicaid reimbursement had a lower percentage of Medicaid beneficiary patients than physicians in localities with usual and customary fees. Medicare patients constituted a disproportionate percentage of internist practices. Research and policy implications are discussed. Appendixes provide further information on utilization and on study procedures.

HRP-0901695/7 PC **A04**/MF **A01**
Chase, Rosen and Wallace, Inc., Alexandria, VA.
Description and Documentation of the Dental Auxiliary School Dental Delivery System.
1978, 75p DHEW/PUB/HRA-78/50
Contract PHS-HRA-231-76-0021

This 20-month project was initiated in June 1976, using the integrated systems approach. The project was implemented in five steps: literature search; protocol development; site visits; composite system synthesis; and final report. The dental delivery system was examined in terms of such characteristics as organization, funding, services, effectiveness, efficiency, and quality assurance. Consideration was also given to access, cost, education, enrollment, environment, evaluation, facilities, financing, manpower resources, marketing, mode of delivery, prevention, recordkeeping, treatment, types of services, and utilization. A composite description of a dental hygiene school dental delivery system was developed. Three dental hygiene schools were visited. Clinic operations were observed, and information was elicited from professional and administrative staff members. Conclusions were threefold: (1) the principal objective is the education of students, and this determines the nature of the dental delivery system; (2) the dental delivery systems of the three schools are similar; and (3) the delivery of services by dental hygiene schools in the United States is estimated to be less than 1.5 percent of comparable services by licensed hygienists in private practice. Appendixes contain flow charts of patient processing, sample patient record forms, and classifications of dental care difficulty. Supporting data and a bibliography are provided.

NTISUB/E/294-021 PC **A04**/MF **A01**
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Clinical Diagnosis, Prognosis, and Treatment of Cancers of the Digestive Tract.
Special listing.
16 Nov 79, 56p NCI/ICRDB/SL-311
Supersedes NTISUB/E/294-004.

The SPECIAL LISTING of Current Cancer Research Projects is a publication of the INTERNATIONAL CANCER RESEARCH DATA BANK (ICRDB) Program of the National Cancer Institute. Each LISTING contains descriptions of ongoing projects in one selected cancer research area. The research areas include: Diagnostic and prognostic studies of tumors of the digestive tract; Therapy for tumors of the gastrointestinal tract; Education and rehabilitation of patients with tumors of the digestive tract.

NTISUB/E/294-022 PC **A03**/MF **A01**
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Diagnosis and Treatment of Cancer of the Lower Respiratory Tract.
Special listing.
30 Nov 79, 29p NCI/ICRDB/SL-318
Supersedes NTISUB/E/294-005.

The SPECIAL LISTING of Current Cancer Research Projects is a publication of the INTERNATIONAL CANCER RESEARCH DATA BANK (ICRDB) Program of the National Cancer Institute. Each LISTING contains descriptions of ongoing projects in one selected cancer research area. The research areas include: Screening, diagnosis, and prognosis; Therapy; Broad programs and cooperative groups.

NTISUB/E/295-008 PC **A04**/MF **A01**
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Etiology, Epidemiology, and Related Biology of Gastrointestinal, Oral, Esophageal, and Pancreatic Cancer.
Special listing.
4 Dec 79, 75p NCI/ICRDB/SL-310
Supersedes NTISUB/E/295-002.

The SPECIAL LISTING of Current Cancer Research Projects is a publication of the INTERNATIONAL CANCER RESEARCH DATA BANK (ICRDB) Program of the National Cancer Institute. Each LISTING contains descriptions of ongoing projects in one selected cancer research area. The research areas include: Epidemiology and etiology of collon and rectal cancer; Biochemistry and membrane physiology of colon and rectal cancer; Other research on normal and neoplastic colonic and colorectal cells and tissues; Epidemiology, etiology, and pathobiology of gastric cancer; Epidemiology, etiology, and pathology of esophageal, oral and salivary gland cancers; Epidemiology, etiology, and related biology of pancreatic cancer; Other research on cancer of the gastrointestinal tract.

NTISUB/E/296-016 PC **A03**/MF **A01**
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Nitroso Compounds.
Special listing.
5 Dec 79, 40p NCI/ICRDB/SL-314
Supersedes NTISUB/E/296-003.

The SPECIAL LISTING of Current Cancer Research Projects is a publication of the INTERNATIONAL CANCER RESEARCH DATA BANK (ICRDB) Program of the National Cancer Institute. Each LISTING contains descriptions of ongoing projects in one selected cancer research area. The research areas include: Effect of nitroso compounds on nucleic acids; Other biochemical and immunological effects of nitroso compounds; Metabolism and pharmacology of nitroso compounds; Cell transformation by nitroso compounds and related in vitro studies; Studies of specific types of cancers induced by nitroso compounds; Effects of radiation, drugs, diet, and other factors on carcinogenesis by nitroso compounds; Other in vivo studies of carcinogenesis by nitroso compounds; Nitroso compounds in the environment; Chemistry, synthesis, and reactions of nitroso compounds; Analytical methods for nitroso compounds.

NTISUB/E/296-017 PC **A03**/MF **A01**
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Carcinogenic Substances in Food and Drugs, and Related Epidemiology.
Special listing.
3 Dec 79, 48p NCI/ICRDB/SL-313
Supersedes NTISUB/E/296-002.

The SPECIAL LISTING of Current Cancer Research Projects is a publication of the INTERNATIONAL CANCER RESEARCH DATA BANK (ICRDB) Program of the National Cancer Institute. Each LISTING contains descriptions of ongoing projects in one selected cancer research area. The research areas include: Studies of aflatoxins and other mycotoxins; Food-related studies of nitroso compounds, nitrites and nitrates; Cancer-related studies ofother specific agents in foods; Epidemiology of cancer in relation to diet; Influence of dietary factors on susceptibility to chemical and other carcinogens in experimental animals; Oncogenic side-effects of drugs.

PB80-106024 PC **A03**/MF **A01**
National Maritime Research Center-Kings Point, NY.
Characteristics of the Chronic Repeater of Illnesses and Injuries Onboard U.S. Ships and A Survey of Operator Claims Costs.
Technical rept. 1976-77.
Jul 79, 26p NMRC-KP-196

The study consists of the analysis of the illness and injury record of all U.S. Seamen for whom reports have been received by the Marine Index Bureau (MIB). The study concentrates on the influence of the 'chronic repeater' on personnel injury and illness claims.

PB80-106321 PC **A10**/MF **A01**
General Accounting Office, Washington, DC. Health Resources Div.
Health Costs Can Be Reduced By Millions of Dollars if Federal Agencies Fully Carry Out GAO Recommendations.
Report to the Congress.
13 Nov 79, 218p HRD-80-6

Because of the increasing costs of Government health programs--a subject of nationwide concern--GAO reviewed how agencies have implemented its recommendations to help control the costs of health programs. GAO found that 84 of its reports issued from January 1974 through December 1978 on Federal and Federal/State health programs contained 262 cost-saving recommendations to the Congress and responsible Federal agencies. So far, 98 recommendations have been put into effect and savings of millions of dollars realized. However, 164 others have either not been carried out or only partially so. The Congress and the agencies should put into effect the outstanding recommendations. Millions more would be saved.

PB80-107006 Mag Tape $725.00
National Center for Health Statistics, Hyattsville, MD.
Vital Statistics Natality Data, Detail, 1970.
Data file,
Robert Heuser. 1970, mag tape NCHS/DF-79/069
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Product if you have questions. Price includes documentation, PB-299 680, and PB80-107014.

Vital statistics data relating to natality provide demographic and health data for births occurring during the calendar year. The data are based on information abstracted from birth certificates filed in vital statistics offices of each State and the District of Columbia. Prior to 1972, data are based on a 50-percent sample of birth certificates from all States. Beginning in 1972, data are based on 100 percent of the birth certificates from some of the States and on a 50-percent sample from the remaining States. The number of States from which 100 percent of the records are used has increased from 6 in 1972 to 33 in 1977 and these States are identified by data year in Appendix A of the tape documentation package. Demographic data include variables such as date of birth, age and educational attainment of parents, legitimacy status, live-birth order, race, sex, and geographic area. Health data include such items as birth weight, gestation and prenatal care. The number of births and birth rates for selected demographic variables are published annually in Vital Statistics of the United States, Volume I, 'Natality.' A technical appendix giving information regarding the historical aspect and limitations of the data is included in the published volumes. Specialized reports are published periodically in Vital and Health Statistics.

PB80-107014 PC **A05**/MF **A01**
National Center for Health Statistics, Hyattsville, MD. Div. of Vital Statistics.
Vital Statistics Natality Data, Detail, 1970. Tape Contents and Documentation Package.
1970, 77p NCHS/DF-79/069B
For system on magnetic tape, see PB80-107006. See also PB-299 680.

Vital statistics data relating to natality provide demographic and health data for births occurring during the calendar year. The data are based on information abstracted from birth certificates filed in vital statistics offices of each State and the District of Columbia. Prior to 1972, data are based on a 50-percent sample of birth certificates from all States. Beginning in 1972, data are based on 100 percent of the birth certificates from some of the States and on a 50-percent sample from the remaining States. The number of States from which 100 percent of the records are used has increased from 6 in 1972 to 33 in 1977 and these States are identified by data year in Appendix A of the tape documentation package. Demographic data include variables such as date of birth, age and educational attainment of parents, legitimacy status, live-birth order, race, sex, and geographic area. Health data include such items as birth weight, gestation and prenatal care. The number of births and birth rates for selected demographic variables are published annually in Vital Statistics of the United States, Volume I, 'Natality.' A technical appendix giving information regarding the historical aspect and limitations of the data is included in the published volumes. Specialized reports are published periodically in Vital and Health Statistics.

PB80-114184 PC **A11**/MF **A01**
National Research Council, Washington, DC.
The Contribution of Drinking Water to Mineral Nutrition in Humans.
Aug 79, 244p
Contract EPA-68-01-3169

The first undertaking of the Safe Drinking Water Committee of the National Academy of Sciences was the identification of substances and their concentrations in the nation's water supply that might pose risks to the public health. This report, on the other hand, identifies and discusses substances found in drinking water which may have nutritional significance. The substances addressed include calcium, magnesium, phosphorus, fluoride, sodium, potassium, chloride, iodine, iron, copper, zinc, selenium, manganese, arsenic, nickel, vanadium, silicon, molybdenum, and chromium. For each substance, data on occurrence in food and water are reviewed, nutritional requirements, toxicity versus essential levels, and the contribution from drinking water are assessed. Recommendations are made regarding the appropriateness of controlling these substances in drinking water.

PB80-116106 PC **A10**/MF **A01**
Office of Technology Assessment, Washington, DC.
A Review of Selected Federal Vaccine and Immunization Policies.
Sep 79, 208p OTA-H-96
Library of Congress catalog card no. 79-600165.

The study addresses four areas of concern regarding Federal vaccine policies: (1) the impact of Federal policies on the commitment of American pharmaceutical manufacturers to conduct vaccine research and develop and supply vaccines; (2) the adequacy of Federal vaccine safety and efficacy requirements; (3) the potential utility and limitations of cost-effectiveness analysis (CEA) in decisions regarding the allocation of Federal funds for vaccination and other health programs; and (4) vaccine liability and compensation issues that have arisen in connection with nondefective, properly administered vaccines used in public immunization programs. The report discusses the lack of Medicare reimbursement for vaccinations. Options for Congressional actions are also described.

RERF-TR-13-78 PC **A03**/MF **A01**
Radiation Effects Research Foundation, Nagasaki (Japan). Nagasaki Branch.
Relationship Between Epidemiological Factors and Mortality among Atomic Bomb Survivors, Hiroshima and Nagasaki.
M. Nagai. Jan 78, 26p
Contract EX-76-C-28-3161
In Japanese and English.

Information concerning a number of environmental and individual factors was obtained by a main questionnaire survey conducted in 1965 on 11,724

males aged 40-69 years in the JNIH-ABCC Life Span Study sample. In the ensuing 10 year period, some 2,834 deaths occurred in this population. This is a study of mortality as related to certain environmental and socioeconomic factors. The following observations may be made from this study: high death rates for all causes of death, cerebrovascular diseases, all malignant neoplasms, and stomach cancer were associated with lower socioeconomic status. Smoking was a significant risk factor for all causes of death, ischemic heart disease, all malignant neoplasms, stomach cancer, and cancers of the trachea, bronchus, and lung. The death rate for cardiovascular disease was significiantly higher for those with higher body weight. A tendency was noted for higher death rates for all causes, all malignant neoplasms, lung cancer, and stomach cancer for those who were married earlier in life. This may be related to age at first marriage and social status. (ERA citation 04:052203)

RERF-TR-3-78 PC **A02**/MF **A01**
Radiation Effects Research Foundation, Nagasaki (Japan). Nagasaki Branch.
Relation of Radiation to Gastric Carcinoma Observed in Autopsy Cases in the Life Span Study Sample, Hiroshima and Nagasaki, 1961–74.
T. Yamamoto, and Y. Shimizu. Nov 78, 18p
Contract EX-76-C-28-3161
In Japanese and English.

A study was made of the relation to atomic bomb radiation of 535 cases of gastric carcinoma among 4,694 deaths occurring in a fixed population of Hiroshima and Nagasaki who were autopsied between 1961 and 1974. The proportion of all autopsies with gastric carcinoma as autopsy diagnosis tended to be high in the high dose group, but it could not be concluded with the present amount of information that there is a relation between gastric carcinoma and radiation in this autopsy study. Although no specific distribution of the histological types of gastric carcinoma was noted by radiation dose, the data indicated increases in the degree of extension of tumor cells in the gastric wall and the degree of metastasis to the lymph nodes seemed to be high in the high dose group. (ERA citation 04:052210)

RERF-TR-6-78 PC **A02**/MF **A01**
Radiation Effects Research Foundation, Hiroshima (Japan).
Autopsy Study of Cerebrovascular Disease in Japanese Men Who Lived in Hiroshima, Japan and Honolulu, Hawaii.
Y. Mitsuyama, L. R. Thompson, T. Hayashi, K. K. Lee, and R. J. Keehn. Jan 79, 17p
Contract EX-76-C-28-3161
In Japanese and English.

Evidence of cerebrovascular disease at autopsy was compared in two groups of men, 186 long time residents of Hiroshima, Japan and 253 men of Japanese ancestry long resident in Honolulu, Hawaii. They were from 45 to 71 years of age at death. Atherosclerosis of the circle of Willis and its major branches, sclerosis of the intraparenchymal arteries and the frequency of cerebral hemorrhage and cerebral infarct were compared in the two populations. The Honolulu subjects had significantly more atherosclerosis of the circle of Willis, but less intraparenchymal artery sclerosis and less cerebral infarction. Cerebral hemorrhage was equally frequent in the two cities. It was concluded that cerebral infarction is more frequent in Japanese men in Hiroshima than Honolulu, and that men of Japanese ancestry in Honolulu are spared an appreciable risk of cerebral infarction through decreased frequenncy of intraparenchymal arterial sclerosis despite higher levels of atherosclerosis of large intracranial arteries. (ERA citation 04:052202)

RERF-TR-7-78 PC **A02**/MF **A01**
Radiation Effects Research Foundation, Hiroshima (Japan).
Autopsy Study of Small Cardiac Scars in Japanese Men Who Lived in Hiroshima, Japan and Honolulu, Hawaii.
A. Steer, S. S. Lee, G. N. Stemmermann, T. Yamamoto, and G. G. Rhoads. Oct 78, 15p
Contract EX-76-C-28-3161
In Japanese and English.

Japanese men long resident in Honolulu, Hawaii have significantly more ischemic heart disease, but significantly fewer small cardiac scars than men in Hiroshima, Japan. These scars occur in three forms: (1) small scars in the mural myocardium which account for the difference in frequency of small lesions in the two cities, and are of uncertain etiology; (2) areas of diffuse fibrosis in the papillary muscles. These are equally frequent in the two cities, and are associated with advancing age and sclerosis of papillary muscle arteries; and (3) focal scars in the papillary muscles. These are more frequent in Honolulu than Hiroshima. They are healed infarcts due to ischemic heart disease and are associated with a severe degree of extramural coronary artery sclerosis. Small mural myocardial scars, when present, are usually found in multiple sites, and are not related to age at death or heart weight. They are more common in the presence of sclerosis of intramural small arteries, but this association does not explain their more frequent occurrence in Hiroshima. There is no evidence that they are related to A-bomb radiation exposure. (ERA citation 04:052200)

6F. Environmental Biology

AD-A075 749/2 PC **A04**/MF **A01**
Air Materiel Command Wright-Patterson AFB Oh
Morale of Workers Exposed to High Levels of Occupational Noise,
Jean Spencer Felton , and Carol Spencer. 1955, 62p

It has been history's unfortunate observation that each new technological era has produced materials deleterious to man's well-being. Lead, mercury, siliceous dust and, more recently, newer energy forms, have caused illness or death among workers. It was decided that such antithetical circumstances should be explored. If high morale were found and its determinants identified, the findings could have practical application to other Air Force job situations where adverse working conditions produced apprehension or reduced effectiveness. Also, insights into these relationships might result in better placement.

AD-A075 763/3 PC **A04**/MF **A01**
Connecticut Univ Storrs
A Scientific Study to Develop a Practical Method for Assessing the Cleanup of 'Sour' (High Sulfur) Crude Oil Spills in Littoral Sands using Benthic Microorganisms.
Final rept.,
Larry Frankel. 1979, 56p USCG-D-27-79, CGR/DC-4/79
Contracts D-27-79, 4/79

The objective of this study was to determine if a practical method could be developed for assessing the cleanup of a single spill of Arabian Light Stabilized crude oil in littoral sands and gravels by using microorganisms as indicators. Crude oil was spilled on beaches at three localities along the Connecticut shoreline where different environmental conditions are present and the microbiota and sediments in oiled plots were compared with those in unoiled plots for up to 15 months. The study showed that microorganisms cannot be used as indicators of the effectiveness of cleanup operations in these sediments. Species diversity in the oiled and unoiled plots at each study locality was about the same throughout the study and, in general, only slight differences in the number of individuals were observed for most species. The spilled oil was rapidly removed from these sediments by natural processes. Retention was longest in the sediments that had relatively large amounts of organism produced mucilaginous materials. However, even in these sediments, the crude oil was not detected approximately three months after it was spilled. (Author)

AD-A075 788/0 PC **A02**/MF **A01**
Army Engineer Waterways Experiment Station Vicksburg Ms
Investigation of Two Insect Species for Control of Eurasian Watermilfoil.
Annual rept. for FY 1978,
Gary R. Buckingham , Chris A. Bennett , and Bonnie M. Ross. Sep 79, 24p Rept no. WES-MP-A-79-4

This report describes the initial work involved with the evaluation of two species of insects for biological control of Myriophyllum spicatum L. (Eurasian watermilfoil). It is believed that both insect species were accidentally introduced from Europe. They are Litodactylus leucogaster (Marsh.) and Acentropus niveus (Olivier). L. leucogaster appears to be relatively host-specific. Researchers have been unable to establish a viable colony of A. niveus. All results are very preliminary at this writing. (Author)

AD-A076 025/6 PC **A15**/MF **A01**
Battelle Columbus Labs Oh
Land Based Environmental Monitoring at Johnston Island - Disposal of Herbicide Orange.
Final rept. May 77-Sep 78,
T. J. Thomas , D. P. Brown , J. Harrington , T. Stanford , and L. Taft. Sep 78, 340p CEEDO-TR-78-38, OEHL-TR-78-87
Contract F08635-76-D-0168

As a part of the U.S. Air Force final Environmental Impact Statement of incineration of Herbicide Orange from Johnston Island, the Air Force stated that a monitoring program would be conducted to demonstrate that the landbased transfer operations were carried out in an environmentally safe manner. Battelle, Columbus Laboratories conducted these monitoring programs on Johnston Island. The monitoring of at-sea incineration operations were conducted by TRW and have been reported elsewhere. Concentrations of 2,4-D and 2,4,5-T found in the ambient air and water samples were minimal. No TCDD was detected in any air or water samples. No changes that could be attributed to the operations were noted in indigenous plant or bird populations. Results of quality control sampling revealed that the required level of drum cleaning was achieved. Industrial Hygiene evaluations of the land-based operations revealed that only minor accidents or injuries occurred and exposure of workers to airborne 2,4,-D and 2,4,5-T were well below permissable levels. No adverse consequences of the minimal release of Herbicide Orange into the Johnston Atoll environment were observed. (Author)

AD-A076 290/6 Not available NTIS
Tennessee Univ Knoxville
On Bifurcation in Ecosystem Models,
Thomas G. Hallam. 1979, 9p
Availability: Pub. in Annals of the New York Academy of Sciences, v316 p482-489, 28 Feb 79 (No copies furnished by DTIC).

No abstract available.

CONF-7808112-1 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Mineral Cycling in Tropical Forests. Environmental Sciences Division Publication No. 1269.
D. W. Cole, and D. W. Johnson. 1978, 29p
Contract W-7405-ENG-26
North American forest soils conference, Ft Collins, CO, USA, 6 Aug 1978.

Generalizations concerning the cycling of nutrients in the tropics are difficult because tropical forests have not been extensively studied and tropical systems are more diverse than temperate zones. Several conclusions can be made regarding nutrient dynamics in tropical forests. Selective storage of nutrients within the vegetative component of the ecosystem is not a universal means of nutrient conservation in tropical areas. There is appreciably more leaf turnover expressed as litterfall in lowland tropical forests than any other forest type. High rate of turnover is also found in the forest floor due to high temperature and humid conditions of these sites. This high rate of decomposition has an impact on the storage of carbon, affecting in turn the capacity of these systems to store nitrogen. The implication of such difference could potentially be felt in several ways. Ecologically we should expect to see plant species capable of nitrogen fixation. Management practices which exclude nitrogen fixers or cause a decrease in soil organic matter could detrimentally effect the nitrogen status and thus the productivity of these ecosystems. The rapid rate of organic turnover, both foliar and soil, also suggests that these forests have some mechanism of rapidly recapturing critical nutrients prior to leaffall. In general, the most serious effects of site clearing and burning seem to relate to N losses and erosion. Burning releases cation nutrients from vegetation and must result in some N loss. However, cations so released are retained

on soil exchange sites and N losses are generally quickly compensated for by N fixation. It appears that N conservation is very tightly linked to C conservation in tropical soils. Clearing, burning, and cultivation all result in carbon losses from the soil which in turn cause a release of N. If sites are reforested, soil C contents build up and N losses from site disturbances are recovered fairly quickly by fixation. (ERA citation 04:052146)

COO-2307-16 PC **A02**/MF **A01**
Cincinnati Univ., OH. Dept. of Biological Sciences.
Biological/Environmental Relationships in Desert Ecosystems of the Nevada Test Site.
J. C. Beatley. Mar 79, 12p
Contract EY-76-S-02-2307

Activities covered are: computer and related work (corrections and updating of card decks for Nevada Test Site data, and transfer of data and programs to tapes); publication of shrub (and tree) data for undisturbed Test Site vegetation in 1963 and 1975 (DOE/EV/2307-15); work performed in this contract period on the publications covering the vascular plants of central-southern Nevada (TID-26881); and work and publications in connection with the Endangered and Threatened species of central-southern Nevada. (ERA citation 04:052155)

COO-2532-4 PC **A09**/MF **A01**
Woods Hole Oceanographic Institution, MA.
Effects of Environmental Stresses on the Species Composition of Phytoplankton Populations. Progress Report, May 1, 1978--February 28, 1979.
J. H. Ryther, and J. G. Sanders. Feb 79, 199p
Contract EY-76-S-02-2532

Unfiltered Vineyard Sound seawater circulated through 1000-liter fiberglass tanks at 10% volume exchange per day maintains a reasonably constant phytoplankton community that is also representative of the natural assemblage. Sixteen such tanks have been stresed with addition of free chlorine and copper, and temperature increase, in all possible combinations and at increments of 0.05 ppM Cl exp - , 5.0 mu g/l Cu exp ++ , and 2 exp 0 C temperature increase in experiments of 4 to 6 weeks duration. At the lowest stress level, the tank culture exposed to chlorine after 19 days had a decreased total population size, lower diversity, a similarity index significantly different from the control, and a community dominated by Skeletonema costatum, which was absent from the control culture. The copper-exposed culture showed similar but smaller effects. Chlorine and copper together cancelled each others effects. No effect was seen from a temperature increase of 2 exp 0 C alone or together with other stresses. The experiment at the next highest stress level was complicated by sub-zero temperatures and freezing input lines. The greatest effect was caused by temperature increase (+4 exp 0 C) which caused a shift from diatoms to a variety of flagellates. Diatoms, particularly S. costatum and Chaetoceros spp., remained dominant in the C exp - and Cu exp ++ stressed culture not exposed to thermal increase. (ERA citation 04:052220)

COO-4331-2 PC **A02**/MF **A01**
Pennsylvania State Univ., University Park. Center for Air Environment Studies.
Air Pollution Effects on Food Quality. 2ND Annual Progress Report.
E. J. Pell. Feb 79, 14p CAES-525-79
Contract EE-77-S-02-4331

Progress is reported in studies to determine the effect of acute, toxic exposures of ozone to alfalfa, potato, and soybean plants. The objective has been to correlate the foliar response with alterations in quality of the edible portion of the plant viz. the leaf, tuber and seed of alfalfa, potato and soybean, respectively. In 1977 the authors (1) modified our fumigation facilities, (2) developed protocol for studies with alfalfa and potato, and (3) conducted studies on flavonoid status of alfalfa and a series of parameters of potato tubers. In 1978 the authors (1) conducted more indepth studies with alfalfa, (2) repeated the potato study, (3) began to develop protocol for measuring additional parameters of alfalfa and potato quality, and (4) developed protocol for cultivating and exposing soybean plants. (ERA citation 04:052226)

COO-4941-1 PC **A02**/MF **A01**
Rhode Island Univ., Kingston. Graduate School of Oceanography.
Fatty Acid Ecology of Plankton Communities. Progress Report, May 1, 1978--April 30, 1979.
H. P. Jeffries. Dec 78, 22p
Contract EP-78-S-02-4941

As a test of the hypothesis that fatty acid patterns of entire planktonic communities should be less variable and more predictable in offshore waters than estuarine habitats, monthly samples have been taken in Block Island Sound, Narragansett Bay, and Green Hill Pond (a brackish lagoon), R.I. Observations include physical environmental properties, standing crop estimates, and fatty acid distribution in two size fractions - phytoplankton-microzooplankton and zooplankton. A second hypothesis states that the annual sample trajectory of a zooplankton community displayed in biochemical(fatty acid) phase space is related to production, but only under certain circumstances. Samples were also taken along the major axes of Ria de Arosa and Ria de Muros y Noya, two deep embayments on the Atlantic coast of northern Spain. Results on the first hypothesis show that each system in the gradient of environmental severity behaves individually during the autumnal cooling period, when plankton production declines to annual minima. Spatial distribution of zooplankton in the two adjacent Spanish rias differ completely, both qualitatively and quantitatively. A comparison between the Spanish rias and the three US estuaries should reveal the basic nature of chemically defined stable domain in community structure. From these relations, the fate of communities subjected to either natural stressors or anthrogenic perturbation may be predicted with economy, speed, and objectivity. (ERA citation 04:052158)

DOE/EV/70029-4 PC **A03**/MF **A01**
Oregon State Univ., Corvallis. School of Oceanography.
Mesoscale Studies of Flow Regimes and Fluxes of Particulate Matter in Coastal Waters. Annual Progress Report, 1 April 1978--31 March 1979.
H. Pak, L. F. Small, J. R. V. Zaneveld, and D. M. Nelson. Feb 79, 29p RLO-2227/T29-4
Contract EY-76-S-06-2227-029

Progress is reported on the following research projects: winter effects on patterns of total suspended particulate matter and of phytoplankton; development of a numerical model of time-space distribution of suspended particulate matter in the near-coast region; development and testing of in situ underwater instruments; and identification of spatial and temporal patterns of biogenic and nonbiogenic particles, and healthy and non-healthy biogenic fractions for more rational placement of near-coast structures and identification of productive and non-productive zones. (ERA citation 04:049181)

NUREG-0596 PC **A06**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Div. of Site Safety and Environmental Analysis.
Non-Radiological Consequences to the Aquatic Biota and Fisheries of the Susquehanna River from the 1979 Accident at Three Mile Island Nuclear Station.
Regulatory rept. Mar-Jul 79,
Clarence R. Hickey, Jr., and Robert B. Samworth. Nov 79, 117p

The non-radiological consequences to the aquatic biota and fisheries of the Susquehanna River from the March 28, 1979 accident at Three Mile Island Nuclear Station were investigated through the post-accident period of July 1979. Thermal and chemical discharges during the period did not exceed required effluent limitations. Several million gallons of treated industrial waste effluents were released into the river which were not of unusual volumes compared with normal operation and were a small proportion of the seasonally high river flows. The extent and relative location of the effluent plume were defined and the fishes known to have been under its immediate influence were identified, including rough, forage, and predator/sport fishery species. No impacts to benthic invertebrates or fishes were detected. No unusual conditions of fish disease or mortalities were noted. Normal seasonal increases in faunal abundance and species composition occurred, as did the onset of the fish spawning season in April. Post-accident recreational fishing patterns temporarily departed from historical trends, most notably during April when Anglers returned an unprecedented 100% of their catches. Several generic aspects are discussed, including: impact detection; data needs; and the applicability of the findings for radiological assessment.

ORNL/EIS-111 PC **A13**/MF **A01**
Oak Ridge National Lab., TN.
Biomedical and Environmental Aspects of the Thorium Fuel Cycle: A Selected, Annotated Bibliography.
R. A. Faust, C. S. Fore, M. V. Cone, H. R. Meyer, and J. E. Till. Jul 79, 292p
Contract W-7405-ENG-26

This bibliography was compiled to assist in the evaluation of the health and environmental consequences of high specific activity thorium and related nuclides which could be released to the environment by activities related to the Thorium Fuel Cycle. The general scope covers studies regarding potential releases, environmental transport, metabolism, dosimetry, dose assessment, and overall risk assessment for radionuclides specific to the NASAP project. This publication of 740 abstracted references highlights the biological and medical aspects of thorium 228 and thorium 232 in man and animals. Similar studies on related nuclides such as radium 224, radium 226, radium 228, and thorium 230 are also emphasized. Additional categories relevant to these radionuclides are included as follows: chemical analysis; ecological aspects; energy; geological aspects; instrumentation; legal and political aspects; monitoring, measurement and analysis; physical aspects; production; radiation safety and control; and waste disposal and management. Environmental assessment and sources categories were used for entries which contain a multiple use of categories. Leading authors appear alphabetically within each category. Indexes are provided for : author(s), geographic location, keywords, title, and publication description. The bibliography contains literature dating from December 1925 to February 1978. (ERA citation 04:052152)

PATENT-4 160 033 PC **A02**/MF **A01**
Department of the Navy Washington DC
Method for the Control of Mosquitos by the Use of Film-Forming Materials.
Patent,
William D. Garrett, and William R. Barger. Filed 31 Jan 77, patented 3 Jul 79, 5p AD-D006 430/3, PAT-APPL-764 310
Supersedes PAT-APPL-764 310-77, AD-D003 924.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A method of controlling mosquitos by adsorbing onto the surface of a body of water suitable for breeding mosquitos a monomolcular or duplex film of an organic material which reduces the surface tension of the body of water of 30 dynes/cm or less. (Author)

UCRL-Trans-1571 PC **A02**/MF **A01**
Changes in the Cardiovascular System of Rabbits Subjected Continuously to a Static Magnetic Field of 600 Oe.
M. Nagakawa. 1978, 8p
Contract W-7405-ENG-48
A , Sangyo Igaku, 20 n2 P112-113 1978.

Cardiovascular changes were investigated in domestic white rabbits (3 to 3.5 kg) following a 5-wk exposure to a static magnetic field of 600 Oe. The animals were exposed in a room at 24 +- 1 exp 0 C, 60 +- 5% relative humidity that was lit from 0600 to 1800 hr. The 6 experimental and 4 control rabbits were injected intramuscularly with 1 mg/kg Reserpine 24 hr prior to measurement of magnetic field effects to suppress reaction to external stimuli. Rabbits exposed to the magnetic field for a comparatively long period had an increased heart rate and peripheral blood volume compared with controls. The increase in blood volume is thought to be due to excitation of heart function and not vasodilation. (ERA citation 04:052240)

UCRL-82996 PC A02/MF A01
California Univ., Livermore. Lawrence Livermore Lab.
Investigation of Ecosystems Impacts from Geothermal Development in Imperial Valley, California.
J. H. Shinn, R. R. Ireland, J. R. Kercher, J. J. Koranda, and G. A. Tompkins. 13 Jul 79, 5p
CONF-790906-13
Contract W-7405-ENG-48
Geothermal Resources Council annual meeting, Reno, NV, USA, 24 Sep 1979.

A summary of three years of field ecological investigation in Imperial Valley Environmental Program is presented. The potential terrestrial habitat impacts of geothermal development are discussed for shorebirds and waterfowl habitat, the endangered clapper rail, powerline corridors, noise effects, animal trace element burdens, and the desert community. Aquatic habitats are discussed in terms of Salton Sea salinity, effects of geothermal brine discharges to the Salton Sea, trace element baselines, and potential toxicity of brine spills in freshwater. Studies of impacts on agriculture involved brine movement in soil, release of trace metals, trace element baselines in soil and plants, water requirements of crops, and H sub 2 S effects on crop production in the presence of CO sub 2 and ozone. (ERA citation 04:051371)

6G. Escape, Rescue, and Survival

AD-A076 135/3 PC A10/MF A01
Army Electronics Command Fort Monmouth N J
A Quantitative Analysis of Handgun Use during the Evasion and Survival Attempts of Army Air Force Aircrew Members during World War II - Data.
Final rept.,
Joseph R. Bream. 8 Jun 79, 201p
Master's thesis.

This study contains the data used to establish the desirable characteristics of handguns for use during evasion and survival attempts of aircrew members downed in hostile territory. The research design and procedures are also presented. (Author)

AD-A076 329/2 PC A06/MF A01
Army Command and General Staff Coll Fort Leavenworth Ks
A Quantitative Analysis of Handgun Use during the Evasion and Survival Attempts of Army Air Force Aircrew Members during World War II.
Final rept.,
Joseph R. Bream. 8 Jun 79, 106p
Master's thesis.

This study establishes desirable characteristics of handguns for use during evasion and survival attempts of aircrew members downed in hostile territory. Based on a quantitative analysis of data from World War II evasion reports of U.S. Army Air Force personnel, the investigation revealed that the primary value of a handgun is affording a psychological sense of security. The weapon can also be used for self-defense, killing small game for food, signaling, and coercion. Recommendations are that effective handguns and ammunition should: be light enough for the aircrew members to carry for long periods of time; be securely attached to the evadee so that they will not be lost during bailout or some other activity where recovery would not be possible; be capable of rapid employment; be very accurate; be capable of disabling an opponent with the first shot; be silent so when employed they will not attract the attention of enemy forces or hostile civilians; be capable of killing small game without destroying the meat. Further, training should also include firing at small moving targets to increase the aircrew member's accuracy. (Author)

AD-A076 330/0 PC A06/MF A01
Army Command and General Staff Coll Fort Leavenworth Ks
F-4 Phantom Aircrew Survival Equipment Evaluation.
Final rept.,
William Edgar Lindsay. 8 Jun 79, 120p
Master's thesis.

The F-4 Phanton aircraft is equipped with an ejection seat which has space provided in a seat kit for the carriage of aircrew survival equipment. This study evaluated the utilization of this space and the equipment available for inclusion in this kit. The space is not being filled with appropriate equipment in many instances because the required density of the packed kit is too great, requiring local units to pack lead shot instead of survival equipment. The survival equipment available to the aircrew in the seat kit is generally of good quality and sound theoretical design. However, there are many areas in which the equipment has not been redesigned to use current technology and thus provide more and better equipment in a smaller space. Additionally, the average survival kit lacks the cold weather survival protective equipment required to sustain the downed aircrew member. This study contains specific recommendations for equipment redesign and selection for the F-4 survival seat pack. (Author)

6H. Food

AD-A075 956/3 PC A10/MF A01
Army Troop Support Agency Fort Lee Va Directorate of Concepts and Systems
Central Food Management System (CFMS).
30 May 79, 214p Rept no. CS-SD-7902

The Central Food Management System (CFMS) was evaluated at Fort Lee, Virginia, during the period September through December 1978 to determine whether the system would improve the efficiency and effectiveness of the food program at installation level and whether the system merits further evaluation at other installations. Also, the system was evaluated to determine the management structure required to operate and manage an installation Central Food Preparation System (CFPS). The latter area was addressed in a separate CFPS study forwarded to DA DCSLOG on 28 December 1978.

AD-A076 127/0 PC A02/MF A01
Armed Forces Food Science Establishment Scottsdale (Australia)
Patrol Ration (One Man), New Prototype Trialed at Exercise Emu 2,
D. J. Lichtenstein , and S. Venkata-Raman. Feb 79, 16p Rept no. AFFSE-1/79

Three new varieties of a prototype Patrol Ration (One Man) were trialled and compared with the current issue Patrol Ration at Exercise Emu 2. The results obtained indicted that the prototype pack, as a whole, was an improvement over the current issue packs in terms of consumer acceptability and Service suitability. These results could be used to design further prototype Patrol Ration (One Man) packs for field evaluation. (Author)

AD-A076 143/7 PC A03/MF A01
Armed Forces Food Science Establishment Scottsdale (Australia)
Laboratory Evaluation of Australian Ration Packs,
P. E. Body , and C. H. Forbes-Ewan. Oct 78, 28p Rept no. AFFSE-3/78

Results of analyses of ration pack items of the 1976/77 packaging programme are presented. Energy values are reported in Kilojoules. Some of the rations have become nutritionally unbalanced, particularly with respect to protein content. Total energy values of some rations are also beiow the recommended level. (Author)

AD-A076 144/5 PC A03/MF A01
Armed Forces Food Science Establishment Scottsdale (Australia)
Field Evaluation of Australian Ration Packs,
W. E. Badcock , and D. J. Lichtenstein. Nov 78, 40p Rept no. AFFSE-4/78

Troop feeding trials were conducted to determine the consumer acceptability and Service suitability of the Patrol Ration (One Man) and Combat Ration (One Man) packs on issue to Australian Servicemen. These trials were superimposed upon field exercises which were conducted by the Services. Results obtained indicated that, although the ration packs are generally satisfactory, implementation of the recommended changes should produce further improvements. (Author)

AD-A076 160/1 PC A03/MF A01
Armed Forces Food Science Establishment Scottsdale (Australia)
Field Evaluation of Australian Ration Packs Combat Ration (One Man) 1976/77 Ration Packing Programme Trialled at Exercise Brahman Drive,
D. J. Lichtenstein. Apr 79, 29p Rept no. AFFSE-2/79

The five new varieties of the Combat Ration (One Man) 1976/77 Ration Packing Programme were trialled and compared with the 1975/76 Combat Ration (One Man) pack. The results obtained indicated that the 1976/77 pack, as a whole, was an improvement over the previous pack in terms of consumer acceptability and Service suitability. These results need to be confirmed at a further field trial. (Author)

AD-A076 161/9 PC A03/MF A01
Armed Forces Food Science Establishment Scottsdale (Australia)
Improving the Quality of Freeze-Dried Meat by Formaldehyde Stabilization,
J. R. Casley-Smith. May 79, 27p Rept no. AFFSE-3/79

This report reviews results obtained in studies investigating techniques for improving the quality of large pieces of freeze-dried meat. (Author)

AD-A076 162/7 PC A02/MF A01
Armed Forces Food Science Establishment Scottsdale (Australia)
Human Dietary Fibre: A Review,
C. H. Forbes-Ewan. May 79, 21p Rept no. AFFSE-4/79

A review is made of the composition, analysis, and relationship to disease of fibre in human nutrition. (Author)

PAT-APPL-6-044 125 PC A02/MF A01
Department of the Army Washington DC
Rapid Water Activity Determining Device and Method.
Patent Application,
Esther B. Garber, and Lloyd Cox. Filed 31 May 79, 11p AD-D006 404/8
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Apparatus and method for determining the water activity (Aw) of a water-containing composition, such as a food, within approximately 10 minutes, by rapidly establishing equilibrium between the water-containing composition and the atmosphere with which it is in contact while maintaining the temperature substantially constant and determining the dew point of this atmosphere, from which the water activity is calculable from the ratio of the partial water vapor pressure at the dew point to the vapor pressure of pure water at the temperature of the atmosphere with which the water-containing composition is in equilibrium. (Author

PAT-APPL-6-053 474 PC A02/MF A01
Department of Agriculture, Washington, DC.
Treatment of Cottonseed Meals Followed by Extraction with Certain Solvents to Remove Gossypol.
Patent Application,
Marie S. Gray, and John P. Cherry. Filed 29 Jun 79, 22p PB80-101025
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A low gossypol, high protein cottonseed product is produced by passing cottonseed meal through a certain series of steps using conventional solvent extraction equipment, and culminating at a point where the cottonseed meal is rendered edible--for human consumption and animal feed--by disruption of gossypol glands and extraction of gossypol pigments.

PAT-APPL-6-055 116 PC A02/MF A01
Department of Agriculture, Washington, DC.
Novel Aroid Products.
Patent Application,
Joseph Chen Chuan Tu. Filed 5 Jul 79, 9p PB80-114812

This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention relates to and has among its objects novel products from Aroids (family Aracae) and novel methods of making the same. Novel products are prepared from Aroid corms by first peeling and washing the corms and then cutting the corms into pieces. Aqueous alkali is applied to the corms to remove acid principles and then the corms are treated with aqueous hydrogen peroxide to prevent discoloration. The so-treated corms are washed with water until they are neutral and then dried.

see individual report for order number and price

Federation of American Societies for Experimental Biology, Bethesda, MD. Life Sciences Research Office.

Evaluation of the Health Aspects of Food Ingredients.

Final rept.

1979,open series

Report of Select Committee on GRAS Substances.

The report, by a group of qualified scientists designated the Select Committee of GRAS Substances (SCOGS), provides an independent evaluation of the safety of food ingredients when used in foods at present or projected levels. Other individual documents are also available:

FDA/BF-80/19. Propionic Acid, Calcium Propionate, Sodium Propionate, Dilauryl Thiodipropionate, and Thiodipropionic Acid. 1979, 33p PC A03, MF A01 **PB80-104599**

FDA/BF-80/18. Hydrogen Peroxide. 1979, 38p PC A03, MF A01 **PB80-104607**

FDA/BF-80/17. Carbon Dioxide. 1979, 29p PC A03, MF A01 **PB80-104615**

FDA/BF-80/20. Nickel. 1979, 30p PC A03, MF A01 **PB80-104623**

6K. Life Support

AD-A076 186/6 PC **A02**/MF **A01**

Battelle Memorial Inst Columbus Ohio Columbus Labs

Experimental Determination of Heat Requirements for the MARK I PTC.

Research rept.,

P. S. Riegel , and J. S. Glasgow. 8 Sep 69, 21p

Contract N00014-66-C-0199

The purpose of the test program was to establish the amount of heat required to maintain the interior of the Mark I PTC at a comfortable level for divers. The test showed that for a condition of moderate forced convection at 810 feet equivalent internal pressure, a heat input of 1620 B/hr (0.48 kw) is required for each degree of temperature differential that is to be maintained between the interior of the PTC and the outside seawater. Thus, if an interior temperature of 90 F is desired in 40 F water, this would require a total heat input of 81,000 B/hr (24 kw). These results are valid only for a condition of forced convection similar to the test situation. Although the heat requirement seems quite high, it is only equivalent to the air-conditioning load in a modern automobile.

AD-A076 187/4 PC **A04**/MF **A01**

Battelle Memorial Inst Columbus Ohio Columbus Labs

Detailed Analysis and Design Review of the MARK IX (Modified) Underwater Breathing Apparatus.

Summary rept.,

J. M. Tierney , and C. T. Marr. 30 Jul 69, 56p

Contract N00014-66-C-0199

The general design of the Mark IX (Modified) Underwater Breathing Apparatus is adequate for the purpose to which the unit is being put. However, because of the limited production and use of the apparatus and its developmental configurations, more caution must be exercised in its use than with other units having a longer history of successful operation. It is the developmental nature of the unit that contributes most to its potential dangers. There is a tendency to extemporize, to use parts not designed for such a life-support system, and to modify components piecemeal. The result is a collection of components that provide underwater breathing capability rather than a polished-design breathing system. The faults found with the apparatus were, for the most part, minor. However, a minor fault or malfunction in a life-support apparatus is potentially more serious than the same type of fault or malfunction in a different apparatus. Also, users of such apparatus, particularly diving apparatus, tend to become complacent with its continued use, making minor problems all the more hazardous.

AD-A076 259/1 PC **A07**/MF **A01**

Battelle Memorial Inst Columbus Ohio Columbus Labs

The Design, Development, and Construction of a High-Pressure Mechanical Respirator for Testing Underwater Breathing Apparatus to The United States Navy.

Final rept.,

Don W. Caudy , and James S. Glasgow. 30 Sep 69, 130p

Contract N00014-66-C-0199

A mechanical respirator (Figure 1) was designed and built to functional requirements furnished by the Navy Experimental Diving Unit. The respirator is intended to provide a standard breathing test for use in evaluating diving equipment. With the respirator, tests can be conducted at atmospheric pressure or to pressures simulating 2000 feet of seawater. The respirator remains exterior to the test chambers during pressurized tests of diving equipment and all controls are available for adjustment without entering the chamber. Equipment for adding heat, moisture, and CO2 to the gases being breathed is provided, although the CO2 addition system is limited to pressures simulating 1500 feet of seawater. The mechanical respirator will breathe tidal volumes from 0.5 to 4 liters at rates of 5 to 60 breathes per minute. The breathing rate is indicated by a meter mounted on the control panel. By changing cam plates the breathing curve can be adjusted such that the exhale-to-inhale time ratio can be varied form 1.0 to 1.3. Hourmeters are provided to record test duration and total machine operating time. (Author)

AD-A076 260/9 PC **A02**/MF **A01**

Battelle Memorial Inst Columbus Ohio Columbus Labs

Development of an Experimental Breathing Gas Heater to Supervisor of Diving United States Navy.

Research rept.,

P. S. Riegel , G. H. Alexander , J. S. Glasgow , and D. W. Frink. 24 Sep 69, 19p

Contract N00014-66-C-0199

Both laboratory testing and field evaluation in a 600-foot saturation dive have shown that the breathing gas is effectively heated by the prototype device. However, the losses between the heater outlet and the diver are too great. To be truly effective, heat must be conserved from the time it leaves the heater until it enters the diver's respiratory passages. Thus, losses between the heater and the diver must be minimized. The breating-gas heater is an effective tool for heating the breath of a diver under controlled research conditions. It can be used for human-subject research on subsequent chamber dives and will pave the way for the development of more compact, sophisticated units once the heating requirements of respiration are established by use of the prototype heater on further hyperbaric experiments.

N80-10800/4 PC **A05**/MF **A01**

Life Systems, Inc., Cleveland, Ohio.

Extended Duration Orbiter Study: CO2 Removal and Water Recovery.

Final Report.

R. D. Marshall, G. S. Ellis, F. H. Schubert, and R. A. Wynveen. May 79, 91p NASA-CR-160317, LSI-ER-319-24

Contract NAS9-15218

Two electrochemical depolarized carbon dioxide concentrator subsystems were evaluated against baseline lithium hydroxide for (1) the baseline orbiter when expanded to accommodate a crew of seven (mission option one), (2) an extended duration orbiter with a power extension package to reduce fuel cell expendables (mission option two), and (3) an extended duration orbiter with a full capability power module to eliminate fuel cell expendables (mission option three). The electrochemical depolarized carbon dioxide concentrator was also compared to the solid amine regenerable carbon dioxide removal concept. Water recovery is not required for Mission Option One since sufficient water is generated by the fuel cells. The vapor compression distillation subsystem was evaluated for mission option two and three only. Weight savings attainable using the vapor compression distillation subsystem for water recovery versus onboard water storage were determined. Combined carbon dioxide removal and water recovery was evaluated to determine the effect on regenerable carbon dioxide removal subsystem selection.

N80-10801/2 PC **A04**/MF **A01**

Life Systems, Inc., Cleveland, Ohio.

Preprototype Vapor Compression Distillation Subsystem.

Final Report.

G. S. Ellis, R. A. Wynveen, and F. H. Schubert. Aug 79, 69p NASA-CR-160332, LSI-ER-312-4

Contract NAS9-15267

A three-person capacity preprototype vapor compression distillation subsystem for recovering potable water from wastewater aboard spacecraft was designed, assembled, and tested. The major components of the subsystem are: (1) a distillation unit which includes a compressor, centrifuge, central shaft, and outer shell; (2) a purge pump; (3) a liquids pump; (4) a post-treat cartridge; (5) a recycle/filter tank; (6) an evaporator high liquid level sensor; and (7) the product water conductivity monitor. A computer based control monitor instrumentation carries out operating mode change sequences, monitors and displays subsystem parameters, maintains intramode controls, and stores and displays fault detection information. The mechanical hardware occupies 0.467 m3, requires 171 W of electrical power, and has a dry weight of 143 kg. The subsystem recovers potable water at a rate of 1.59 kg/hr, which is equivalent to a duty cycle of approximately 30% for a crew of three. The product water has no foul taste or odor. Continued development of the subsystem is recommended for reclaiming water for human consumption as well as for flash evaporator heat rejection, urinal flushing, washing, and other on-board water requirements.

PAT-APPL-6-046 739 PC **A02**/MF **A01**

National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, FL.

A System for Sterilizing Objects.

Patent Application,

C. J. Bryan, E. E. Wright, and C. V. Moyers. Filed 8 Jun 79, 12p N79-33848/9, NASA-CASE-KSC-11085-1

This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A system for producing a stream of humidified sterilizing gas for sterilizing objects such as the water systems in space vehicles is described. The system includes a source of sterilant gas which is fed to a mixing chamber having inlet and outlet ports. Water is carried in the mixing chamber, with the level of the water only partially filling the mixing chamber, to provide an empty space adjacent the top of the chamber. A heater is provided for heating the water in the chamber producing a humidified atmosphere. The sterilant gas is fed through an arcuate shaped tubular member connected to the inlet port of the mixing chamber to produce a vortex type of flow in the sterilant gas being humidified. A tubular member extends from the mixing chamber to supply the humidified sterilant gas to the object to be sterilized. Scrubbers are provided for removing the sterilant gas after use.

6L. Medical and Hospital Equipment

PAT-APPL-6-063 261 PC **A02**/MF **A01**

Department of Health, Education, and Welfare, Washington, DC.

Clot Lysing Timer.

Patent Application,

Stephen B. Leighton, Genesio Murano, Allen Markowitz, and Burt Chicadel. Filed 2 Aug 79, 17p PB80-114887
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A clot lysing timing device consisting of a thermostatically controlled assembly including heated blocks formed with wells to receive precooled test tubes containing liquid with clots formed by the addition of thrombin to plasma (or to a mixture of fibrinogen and plasminogen) containing varying quantities of urokinase, streptokinase or plasmin. The blocks are maintained at 37 C when a precooled test tube with such contents is placed in one of the 37 C wells it activates a microswitch which starts a corresponding timer channel. An opaque sphere is placed on top of the clot. As the clot dissolves (at a rate depending on the quantity of lytic agent incorporated in the clot) the sphere travels to the bottom of the test tube, interrupting an infra red light beam, which stops the corresponding timer channel. The time counts from the respective timer channels can be selectively displayed on an LED digital readout device.

PATENT-3 839 641 Not available NTIS
Department of Health, Education, and Welfare, Washington, DC.
System for Whole Body Imaging and Count Profiling with a Scintillation Camera.
Patent,
Michael B. D. Cooke, and Ervin Kaplan. Filed 22 Jun 73, patented 1 Oct 74, 14p PB80-114903, PAT-APPL-372 835
See also PB80-114754.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

The present invention relates to a method of and apparatus for the radionuclide imaging of the whole body of a patient using an unmodified scintillation camera which permits a patient to be continuously moved under or over the stationary camera face along one axis at a time, parallel passes being made to increase the dimension of the other axis. The system includes a unique electrical circuit which makes it possible to digitally generate new matrix coordinates by summing the coordinates of a first fixed reference frame and the coordinates of a second moving reference frame.

PATENT-3 993 908 Not available NTIS
Department of Health, Education, and Welfare, Washington, DC.
System for Whole Body Imaging and Count Profiling with a Scintillation Camera.
Patent,
Ervin Kaplan, and Michael B. D. Cooke. Filed 3 Jun 74, patented 23 Nov 76, 12p PB80-114754, PAT-APPL-475 438
See also PB80-114903.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

The present invention relates to a method of and apparatus for the radionuclide imaging of the whole body of a patient using an unmodified scintillation camera which permits a patient to be continuously moved under or over the stationary camera face along one axis at a time, parallel passes being made to increase the dimension of the other axis. The system includes a unique electrical circuit which makes it possible to digitally generate new matrix coordinates by summing the coordinates of a first fixed reference frame and the coordinates of a second moving reference frame.

PB80-101405 PC **A06**/MF **A01**
Colorado Univ. Medical Center, Denver.
Quality Assurance for Radiographic X-Ray Units and Associated Equipment,
William R. Hendee, and Raymond P. Rossi. Aug 79, 119p DHEW/PUB/FDA-79/8094, FDA/BRH-79/132
Contract FDA-AD-39

The manual provides detailed quality assurance procedures for general purpose radiographic equipment and ancillary equipment, such as intensifying screens, cassettes, and view boxes. Included is data analysis techniques and recommendations for taking corrective measures. The procedures described in this manual are based on the procedures and equipment used by the contractor. Comparable equipment from other manufacturers may serve equally well in performance of these tests.

6M. Microbiology:

AD-A075 827/6 Not available NTIS
Defence Research Establishment Suffield Ralston (Alberta)
Transport of 'Neisseria meningitidis' Cultures: Growth-Supporting Media and Freezing as an Alternative,
L. A. White , B. E. Holbein , and M. R. Spence. 13 Oct 78, 6p DRB-REPRINT-4224
Summary in French.
Availability: Pub. in Canadian Jnl. of Microbiology, v25 n2 p119-123 Feb 79 (No copies furnished by DTIC).

No abstract available.

CONF-790676-1 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Relationship Between Repair Processes and Mutation Induction in Bacteria.
R. F. Kimball. 1979, 44p
Contract W-7405-ENG-26
Conference on DNA repair and mutagenesis in bacteria, Atlanta, GA, USA, 25 Jun 1979.

The main repair and replication-associated processes that can influence the induction of mutations by various mutagens in bacteria are reviewed. These include both constitutive and induced, error-free and error-prone systems. The mutation yield from a treatment with a mutagen can be markedly affected by which of these systems is operating in a given bacterial species or strain. The effect of these systems on mutation induction by ultraviolet light, monofunctional alkylating agents, base analogues, and frameshift mutagens is discussed in some detail. The bearing of these studies on the practical problems of estimating hazards is briefly considered. 79 references. (ERA citation 04:052224)

PAT-APPL-6-064 678 PC **A02**/MF **A01**
Department of Agriculture, Washington, DC.
Foam Flotation Process for Separating 'Bacillus thuringiensis' Sporulation Products.
Patent Application,
Eugene S. Sharpe, Alberta I. Herman, and Susanne C. Toolan. Filed 8 Aug 79, 10p PB80-114788
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Crystal-enriched suspensions are derived from sporulated cultures of Bacillus thuringiensis by a foam flotation process in which added gelatin causes the spores to be selectively entrained in the foam and thereby separated from the suspensions.

PB80-106495 PC **A09**/MF **A01**
Cornell Univ., Ithaca, NY. Dept. of Environmental Engineering.
Mechanisms of Decreased Digestibility in Chemically-Coagulated Wastewater Sludges.
Final rept.,
James M. Gossett, Steven K. Dentel, and Jeffrey J. Schruben. 31 Mar 79, 182p 065-3/79-1, NSF/ENG-77-06091/PR/79/03
Grant NSF-ENG77-06091

Previous studies have indicated that coagulants used in wastewater treatment (principally alum or ferric chloride) caused resulting sludges to be less biodegradable in subsequent anaerobic digestion. The objectives of this research were: to determine the types of organic materials whose digestibility is most affected by coagulants; and to investigate the effect of coagulants on enzymatic hydrolysis of complex organic material. Substrates studied included: raw wastewater, activated sludge, three proteins, glycine, cellulose, glucose, butyric acid, and palmitic acid. In general, those substrates whose digestibilities were most affected were those that are insoluble in water and/or are known to form complexes with iron or aluminum. Thus, amino acids, proteins, and long-chain fatty acids were particularly affected, while glucose and butyric acid were not. Cellulose was moderately affected, suggesting that physical enmeshment, as well as chemical interactions may be important in determining extent of coagulant effects.

PB80-106842 PC **A03**/MF **A01**
Wisconsin Univ-Madison. Dept. of Bacteriology.
Fermentation of Cellulose and Cellobiose by 'Clostridium thermocellum' in the Absence and Presence of 'Methanobacterium thermoautotrophicum'. (Thermophilic Cellulose Fermentation),
P. J. Weimer, and J. G. Zeikus. 1975, 33p NSF/RA/T-75/119
Grant NSF-AER75-22789

The fermentation of cellulose and cellobiose by Clostridium thermocellum monocultures and C. thermocellum/Methanobacterium thermoautotrophicum cocultures was studied. All cultures were grown under anaerobic conditions in batch culture at 60C. When grown on cellulose, the coculture exhibited a shorter lag before initiation of growth and cellulolysis than did the monoculture. Monocultures produced primarily ethanol, acetic acid, H2, and CO2. Cocultures produced more H2 and acetic acid and less ethanol than did the monoculture. In the coculture, conversion of H2 to methane was usually complete, and most of the methane produced was derived from CO2 reduction rather than from acetate conversion. Agents of fermentation stoppage were found to be toxic concentrations of ethanol and acid in the monoculture and of acid in the coculture. Fermentation of cellobiose was more rapid than that of cellulose. In cellobiose medium, the methanogen caused only slight changes in the fermentation balance of the Clostridium, and free H2 was produced.

PB80-108681 PC **A02**/MF **A01**
Minnesota Univ., Navarre. Gray Freshwater Biological Inst.
Assessment of Bacteria for Lignocellulose Transformations.
Final rept. 1 Mar 77-31 Aug 79,
Ronald L. Crawford. 1979, 6p NSF/RA-790217
Grant NSF-AER76-22254
See also PB-301 032.

In this research approximately 50 eubacteria were isolated and screened for their abilities to convert 14C-(LIGNIN)-lignocelluloses to 14CO2. Nine of the bacteria were able to perform this conversion. The best lignin degrading bacterium isolated was a Bacillus strain isolated for its ability to degrade corn-stalk lignocellulose. This organism has been deposited in the American Type Culture Collection (ATCC 33000). During this investigation the methodologies for the study of lignin biodegradation have improved significantly. This methodological work has prepared the way for (a) laboratory-scale attempts at bioconversion of lignocellulosics to useful commodities, and (b) genetic manipulation of bacteria to improve their lignocellulose transforming capabilities.

6O. Pharmacology

AD-A075 630/4 Not available NTIS
Flying Personnel Research Committee London (England)
Immediate Effects on Human Performance of a 1,5-Benzodiazepine (Clobazam) Compared with the 1,4-Benzodiazepines, Chlordiazepoxide Hydrochloride and Diazepam,
R. G. Borland , and A. N. Nicholson. 26 Nov 74, 11p Rept no. FPRC/1350
Availability: Pub. in British Jnl. of Clinical Pharmacology, 2 p215-221 1974 (No copies furnished by DTIC).

No abstract available.

AD-A075 631/2 Not available NTIS
Flying Personnel Research Committee London (England)
Comparison of the Residual Effects of Two Benzodiazepines (Nitrazepam and Flurazepam Hydrochloride) and Pentobarbitone Sodium on Human Performance,
R. G. Borland , and A. N. Nicholson. 12 Jun 74, 15p Rept no. FPRC/1351

Availability: Pub. in British Jnl. of Clinical Pharmacology, 2 p9-17 1975 (No copies furnished by DTIC).

No abstract available.

AD-A075 666/8 Not available NTIS
Defence Research Establishment Suffield Ralston (Alberta)
Effect of Atropine upon the Cerebrovascular System during Soman-Induced Respiratory Depression,
J. A. Lipp , and T. J. Dola. 8 May 78, 8p DRB-REPRINT-4226
Availability: Pub. in Archives Internationales de Pharmacodynamie et de Therapie, v235 p211-218 1978 (No copies furnished by DTIC).

No abstract available.

AD-A075 667/6 Not available NTIS
Defence Research Establishment Suffield Ralston (Alberta)
Effect of Ethanol, Pentobarbital and Morphine on the Toxicity of Hemicholinium-3 and d-Tubocurarine in Mice,
J. G. Clement. 1 Jun 78, 7p DRB-REPRINT-4223
Availability: Pub. in Archives Internationales de Pharmacodynamie et de Therapie, v236 n1 p60-65 Nov 78 (No copies furnished by DTIC).

No abstract available.

AD-A075 826/8 Not available NTIS
Defence Research Establishment Suffield Ralston (Alberta)
The Ganglionic Blocking Properties of the Cholinesterase Reactivator, HS-6,
Paul M. Lundy. 14 Feb 78, 7p DRB-REPRINT-4221
Summary in French.
Avaialbility: Pub. in Canadian Jnl. of Physiology and Pharmacology, v56 n5 p857-862 1978 (No copies furnished by DTIC).

No abstract available.

AD-A075 934/0 PC **A02**/MF **A01**
Walter Reed Army Inst of Research Washington Dc
Primaquine Analogues: Derivatives of 4-Amino-2-Methoxyacridine,
John P. Scovill , Daniel L. Klayman , Thomas S. Woods , and Thomas R. Sweeney. 11 May 79, 6p
Pub. in The Jnl. of Medicinal Chemistry, v22 n10 p1164-1167 1979.

No abstract available.

AD-A076 274/0 Not available NTIS
Calgary Univ (Alberta) Dept of Chemistry
Product Yields and Mechanism of Penicillamine Radiolysis at pH5,
Greesh Chand Goyal , and David Anthony Armstrong. 14 Nov 75, 11p DRB-REPRINT-4170
Availability: Pub. in Canadian Jnl. of Chemistry, v54 n12 p1938-1947 1976 (No copies furnished by DTIC).

No abstract available.

AD-A076 293/0 Not available NTIS
Indian Inst of Science Bangalore Dept of Biochemistry
Effect of Treatment with alpha-p-Chlorophenoxyisobutyrate and of Cold Exposure on the Distribution of Lipids in Hepatic Mitochondria,
L. Susheela , and T. Ramasarma. 10 Sep 74, 10p
Availability: Pub. in Environmental Physiology and Biochemistry, v5 p8-17 1975 (No copies furnished by DTIC).

No abstract available.

BNL-26293 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Positron-Emitting Radionuclides: Present and Future Status.
R. M. Lambrecht. 1979, 14p CONF-790321-8
Contract EY-76-C-02-0016
International symposium on radiopharmaceuticals, Seattle, WA, USA, 18 Mar 1979.

A tabulation of 157 positron-emitting radionuclides that have the physical characteristics deemed appropriate for radiopharmaceutical use in conjunction with positron emission tomography is provided. The most promising radionuclides are within the production capabilities of a variable-energy cyclotron accelerating protons to about 40 MeV and deuterons, helium-3, and helium-4 to compatable energies. To data only 27 positron-emitting radionuclides have been subjected to radiopharmaceutical consideration, whereas only exp 11 C, exp 13 N, exp 15 O, exp 18 F, exp 38 K, and exp 68 Ga have proved to be especially promising. 2 tables. (ERA citation 04:050424)

CNEA-441 PC **A02**/MF **A01**
Comision Nacional de Energia Atomica, Buenos Aires (Argentina).
Production of Kits for the Labelling with exp 113 Sup(M)In and Sup(99M)Tc, at the CNEA.
M. C. Palcos, H. Kurcbart, G. Nowotny, E. Ramos, and J. G. Riesgo. May 78, 12p
In Spanish.
U.S. Sales Only.

The actual state of the production of radiopharmaceuticals in the form of reagents kits at the C.N.E.A. is described. This could allow the users to label compounds with sup(113m)In and sup(99m)Tc in an easy and reproducible way. At present, the following sets are provided routinarily a) To label with sup(99m)Tc: Albumin macroaggregates: calcium gluconate; antimonium sulfide colloid, sodium phytate; sodium calcium DTPA; seroalbumin; sodium pyrophosphate; sodium citrate. b) To label with sup(113m)In: albumin macroaggregates; PVP-bicarbonate; DTPA; human seroalbumin. Regarding products in a developping stage, we have: to label with sup(99m)Tc: dimercapto-succinic acid, set for the labeiling of human erythrocytes, set for sup(113m)In and sup(99m)Tc concentration and bleomicin; to label with sup(113m)In: EDTMP sup(99m)In. (Atomindex citation 10:451544)

CNEA-442 PC **A02**/MF **A01**
Comision Nacional de Energia Atomica, Buenos Aires (Argentina).
Sup(113M)In E.D.T.M.P. . A New Radiopharmaceutical for Bone Scintillography.
G. Nowotny, A. H. Fraga de Suarez, and A. E. A. Mitta. May 78, 8p
In Spanish.
U.S. Sales Only.

A radiopharmaceutical prepared from ethylendiaminotetrametilenphosphoric acid (E.T.M.P.) is described, which can be labelled with exp 113 In for its use in bone scintillography. This compound has been tested satisfactorily in animals. Chemical controls for labelling are discussed as well as the biological ones for distribution and toxicity. A radiochemical yield of 95% or higher was obtained and after two hours of administration nearly 30% of dose can be localized in skeleton. (Atomindex citation 10:451543)

N80-10266/8 PC **A11**/MF **A01**
McDonnell-Douglas Astronautics Co., St. Louis, Mo.
Feasibility of Commercial Space Manufacturing, Production of Pharmaceuticals. Volume 1: Executive Summary.
Final Report.
9 Nov 78, 228p NASA-CR-161324, MDC-E2104-V-1
Contract NAS8-31353

The feasibility of the commercial manufacturing of pharmaceuticals in space is examined. The method of obtaining pharmaceutical company involvement, laboratory results of the separation of serum proteins by the continuous flow electrophoresis process, the selection and study of candidate products, and their production requirements is presented. Antihemophilic factor, beta cells, erythropoietin, epidermal growth factor, alpha-1-antitrypsin and interferon were studied. Production mass balances for antihemophilic factor, beta cells, and erythropoietin were compared for space verus ground operation.

N80-10267/6 PC **A03**/MF **A01**
McDonnell-Douglas Astronautics Co., St. Louis, Mo.
Feasibility of Commercial Space Manufacturing, Production of Pharmaceuticals. Volume 2: Technical Analysis.
Final Report.
9 Nov 78, 37p NASA-CR-161325, MDC-E2104-V-2
Contract NAS8-31353

A technical analysis on the feasibility of commercial manufacturing of pharmaceuticals in space is presented. The method of obtaining pharmaceutical company involvement, laboratory results of the separation of serum proteins by the continuous flow electrophoresis process, the selection and study of candidate products, and their production requirements is described. The candidate products are antihemophilic factor, beta cells, erythropoietin, epidermal growth factor, alpha-1-antitrypsin and interferon. Production mass balances for antihemophelic factor, beta cells, and erythropoietin were compared for space versus ground operation. A conceptual description of a multiproduct processing system for space operation is discussed. Production requirements for epidermal growth factor of alpha-1-antitrypsin and interferon are presented.

N80-10268/4 PC **A09**/MF **A01**
McDonnell-Douglas Astronautics Co., St. Louis, Mo.
Feasibility of Commercial Space Manufacturing, Production of Pharmaceuticals. Volume 3: Product Data.
Final Report.
9 Nov 78, 191p NASA-CR-161326, MDC-E2104-V-3
Contract NAS8-31353

The feasibility of commercial manufacturing of pharmaceuticals in space is analyzed and the study results are presented. The chronology of the study process is discussed. The separation of serum proteins by the continuous flow electrophoresis process is investigated. The production requirements of twelve candidate products including antihemophilic factor, beta cells, erythropoietin, epidermal growth factor, alpha-1-antitrypsin, and interferon are evaluated.

PAT-APPL-954 218 PC **A03**/MF **A01**
Department of Health, Education, and Welfare, Washington, DC.
Aziridinyl Quinone Antitumor Agents.
Patent Application,
John S. Driscoll, A. Hameed Khan, and Fang-to Chow. Filed 24 Oct 78, 40p PB80-114895
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The use of aziridinyl quinones as antitumor agents is disclosed. A compound which has been found to be particularly effective is the compound 2,5-diaziridinyl-3,6-bis (carboethoxyamino)-1,4-benzoquinone. Treatment is described in connection with various forms of leukemia, for example, as well as B16 melanoma, Lewis lung carcinoma, and the ependymoblastoma brain tumor system.

PATENT-4 159 333 Not available NTIS
Department of Health, Education, and Welfare, Washington, DC.
N-Methyl Levo Benzomorphan Analgesics Having Non-Addictive and Morphine Antagonistic Properties.
Patent,
Everette L. May, and Nathan B. Eddy. Filed 8 Sep 78, patented 26 Jun 79, 5p PB80-114762, PAT-APPL-940 863
Supersedes PB-289 239.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This invention relates to novel analgesics and a method of effecting analgesic activity in man and animals by the administration of an acid addition salt of the levo isomer of a benzomorphan compound. It is an object of this invention to provide novel analgesics and new analgesic methods employing active compounds of low toxicity, which are not habit-forming but exhibit morphine antagonism.

PB80-114853 PC **A02**/MF **A01**
Department of Health, Education, and Welfare, Washington, DC.
7alpha-Methylnorethindrone Enanthate and Its Use in Long Term Suppression of Fertility in Female Mammals.
Richard P. Blye, and Hyun K. Kim. Filed 5 Oct 79, 16p PAT-APPL-6-082 056

It is a primary object of the invention to provide a compound which has progestational and inherent estrogenic characteristics and significantly prolonged anti-fertility effects in female mammals. Still another object of the invention is to provide methods for long-lastingly suppressing fertility in a female mammal using the compound in accordance with the first object of the invention. The above and other objects are achieved in accordance with the present invention by providing a novel steroid, namely, 7 alpha-methylnorethindrone enanthate which is useful as an anti-ferility agent when administered to female mammals. In addition to having progestational and estrogenic characteristics, the compound suppresses fertility for prolonged periods following a single injection.

PB80-116346 PC **A07**/MF **A01**
Food and Drug Administration, Rockville, MD. Bureau of Drugs.
New Drug Evaluation Project Briefing Book.
Annual rept.
Oct 79, 136p FDA/BD-80/34

The report presents, in narrative and tabular form, an overview of the program responsibilities and accomplishments of the New Drug Evaluation staff, Bureau of Drugs, Food and Drug Administration, in fiscal year 1979. It presents statistical data concerning the review of New Drug Application (NDA's) and Investigational New Drug Notices (IND's) including review time and manpower data. It includes information on initiatives taken by the Bureau of Drugs to improve the speed at which safe and effective drugs are approved, including the Bureau's Drug Classification System.

6P. Physiology

AD-A075 623/9 Not available NTIS
Naval Submarine Medical Research Lab Groton Ct
CO2-Induced Kidney Calcification,
K. E. Schaefer , S. M. Pasquale , A. A. Messier , and H. Niemoeller. Feb 77, 11p Rept no. NSMRL-847
Availability: Pub. in Undersea Biomedical Research, Submarine Supplement, pS143-S153 1979 (No copies furnished by DTIC).

No abstract available.

AD-A075 625/4 Not available NTIS
Naval Submarine Medical Research Lab Groton Ct
Effect of Prolonged Exposure to 0.5% CO2 on Kidney Calcification and Ultrastructure of Lungs,
K. E. Schaefer , W. H. J. Douglas , A. A. Messier , M. L. Shea , and P. A. Gohman. 1979, 7p Rept no. NSMRL-868
Availability: Pub. in Undersea Biomedical Research, Submarine Supplement, pS155-S161 1979 (No copies furnished by DTIC).

No abstract available.

AD-A075 634/6 PC **A02**/MF **A01**
School of Aerospace Medicine Brooks AFB Tx
Branches of the Aortic Arch in the Cynomolgus Macague (Macaca fascicularis),
John T. Young , Robert E. Schmidt , and Eugene A. Sprague. 30 Jan 79, 5p Rept no. SAM-TR-78-327
Pub. in the American Jnl. of Veterinary Research, v40 n8 p1127-1130 Aug 79.

No abstract available.

AD-A075 668/4 Not available NTIS
Defence and Civil Inst of Environmental Medicine Downsview (Ontario)
A Scanning Electron Microscopic Study of the Morphology and Geometry of Neural Surfaces and Structures Associated with the Vestibular Apparatus of the Pigeon.
Research paper,
Jack P. Landolt , Manning J. Correia , Eric R. Young , Ronald P. S. Cardin , and Robert C. Sweet. 1975, 31p Rept no. DCIEM-74-RP-1017
Presented at the Annual Meeting (3rd), Society for Neuroscience, San Diego, CA. and at the International Conference on the Biology of the Inner Ear (11th), Wuerzburg, Germany, F. R.
Availability: Pub. in Jnl. of Comparative Neurology, v159 n2 p257-287, 15 Jan 75 (No copies furnished by DTIC).

No abstract available.

AD-A075 689/0 PC **A02**/MF **A01**
Naval Medical Research Lab New London Conn
Studies in Short Duration Auditory Fatigue. II. The Effect of the Duration of the Stimulating Tone. III The Effect of the Interval between Stimuli,
J. Donald Harris. 1950, 20p Rept no. NMRL 168

This series of two experiments investigated the auditory fatigue caused by pure tones up to 70 db sensation level and 0.1 to 10 seconds in duration, and charted the very quick recovery from these relatively mild stimuli. No cumulative fatigue effects were found up to 5 seconds of stimulation, and only a slight cumulative effect between 5 and 10 seconds at the louder levels. The fatigue occasioned by such tones is transitory, disappearing within a half-second or less. The course of its disappearance is exponential or nearly so for all stimuli used. (Author)

AD-A075 794/8 Not available NTIS
Mcgill Univ Montreal (Quebec) Drb Aviation Medical Research Unit
Startle Responses Recorded in the Leg of Man,
S. Rossignol. 30 May 75, 10p
Availability: Pub. in Electroencephalography and Clinical Neurophysiology, v39 p389-397 1975. (No copies furnished by DTIC).

No abstract available.

AD-A075 829/2 Not available NTIS
Florida Univ Gainesville Dept of Physiology
The Effect of Ambient Temperature on Beta-Adrenergic Responsiveness in Rats,
C. C. Barney , M. J. Katovich , M. J. Fregly , P. E. Tyler , and A. R. Dasler. 20 Nov 78, 6p
Contract N00014-75-C-0199
Summary in French.
Availability: Pub. in Canadian Jnl. of Physiology and Pharmacology, v57 n7 p751-755 1979 (No copies furnished by DTIC).

No abstract available.

AD-A075 867/2 PC **A02**/MF **A01**
Wright Air Development Center Wright-Patterson AFB Oh
Fixations During Zero-Reader Approaches in a Jet Aircraft.
Technical rept.,
John L. Milton , and Fred J. Wolfe. Feb 52, 22p Rept no. WADC-TR-52-17

This report covers one of a series of investigations of eye movements of pilots during instrument flight. The frequency, duration, and sequence of eye fixations made by 10 pilots during Zero Reader approaches under simulathed instrument conditions are summarized. Comparisons are made between results obtained on Zero Reader approaches and results obtained on ILAS approaches using a somewhat similar instrument panel arrangement. During Zero Reader approaches the Zero Reader Instrument, the Air Speed and the Gyro Horizon are the most used instruments. The Zero Reader, which includes directional gyro information and cross-pointer information, receives the same amount of attention during Zero Reader approaches as the timal arrangement of the instrument panel for Zero Reader Approaches (using frequency and length of eye movements as the Criteria) would call for location of Zero Reader in the top center position with the Gryo Horizon and Air Speed located adjacent and horizontal. (Author)

AD-A075 914/2 PC **A02**/MF **A01**
Walter Reed Army Inst of Research Washington Dc
Unusual Visual Experiences Reported by Subjects in the British Army Study of Sustained Operations, Exercise Early Call,
Gregory Lucas Belenky. Oct 79, 4p
Pub. in Military Medicine, v144 n10 p695-696, 10 Oct 79. Presented at the International Conference in Psychological Stress and Adjustment in Time of War and Peace (2nd), Jerusalem, 19-23 Jun 78.

No abstract available.

AD-A075 917/5 PC **A02**/MF **A01**
Walter Reed Army Inst of Research Washington Dc
Nutrient Blood Flow in Delayed Axial Pattern Skin Flaps in Pigs,
Alexander M. Guba, Jr. , and John Callahan. 1979, 7p
Pub. in Plastic and Reconstructive Surgery, p372-376 1979. Presented at the Annual Meeting of the American Society of Plastic and Reconstructive Surgeons, 8 Nov 78, Hollywood, FL.

No abstract available.

AD-A075 923/3 PC **A02**/MF **A01**
Armed Forces Radiobiology Research Inst Bethesda Md
Voltage-Dependent Calcium Current Induced by Serotonin,
T. C. Pellmar , and D. O. Carpenter. 7 Nov 78, 4p
Pub. in Jnl. Nature, v277 n5696 p483-484, 8 Feb 79.

No abstract available.

AD-A075 926/6 PC **A02**/MF **A01**
Armed Forces Radiobiology Research Inst Bethesda Md
Alterations Induced in Murine Hemopoietic Stem Cells Following a Single Injection of Corynebacterium parvum,
T. J. MacVittie. 1979, 11p
Pub. in Experimental Hematology Today, p3-10 1979.

No abstract available.

AD-A075 992/8 PC **A02**/MF **A01**
Franklin Inst Philadelphia Pa Labs for Research and Development
The Spectral Density Study of Tracking Performance. Part 1. The Effect of Instructions.
Technical rept.,
Ezra S. Krendel. Jan 52, 24p WADC-TR-52-11-PT-1
Contract AF 33(038)-10420
See also Part 2, ATI-186 688.

Quantitative information about human frequency response functions in the control of a piloted aircraft would provide a rational basis for stability and control criteria. Were the pilot a linear, time invariant system, the ratio of the spectral densities of his output signal to his input signal would be the square of the transfer function describing the pilot. In addition, the computation of these spectral densities affords valuable insights into the response process under study. In an effort to examine the invariance of human system parameters an attempt was made to change an operator's tracking responses by using two different sets of instructions for the tracking of the same statistical input. Two subjects were used in a simple compensatory position tracking device. Although the amplitude response characteristics do not conclusively prove or disprove the invariance of the response patterns, the spectral densities of the signals provide insight into the manner in which the type of instructions affected the response. The value of future research is indicated. (Author)

AD-A075 993/6 PC **A02**/MF **A01**
Columbia Univ New York
Luminance Thresholds for the Resolution of Visual Detail During Dark Adaptation.
Technical rept.,
Jack L. Brown , Clarence H. Graham , Herschel Leibowitz , and Howard B. Ranken. Jan 52, 20p WADC-TR-52-12
Contract AF 33(038)-22616

Luminance thresholds for the visual resolution of various widths of alternating light and dark lines

were determined at various times during dark adaptation. The finest gratings, representing high degrees of visual acuity, show only a single cone curve that drops from a high luminance threshold during the first moments of dark adaptation to a final steady level that is reached after about 7 to 10 minutes in the dark. Coarse gratings produce a duplex curve that shows an initial cone portion and a delayed rod portion. Visual acuity is a parameter that sets the position of a given curve on the log threshold axis. The higher the degree of resolution required, the higher the dark adaptation threshold. At a constant grating luminance, visual acuity rises rapidly to a maximum during dark adaptation; the higher the luminance, the earlier and more rapid the rise and the higher the maximum. Visual acuity increases at all dark adaptation times with increase in luminance. Implications of these findings for instrument lighting are discussed. (Author)

AD-A076 222/9 Not available NTIS
Naval Submarine Medical Research Lab Groton Ct
Longitudinal Health Studies and Medical Patrol Reports. Section 3. Vision of Submariners,
J. A. S. Kinney , S. M. Luria , C. L. McKay , and A. P. Ryan. Feb 76, 11p
Availability: Pub. in Undersea Biomedical Research, Submarine Supplement, pS163-S173 1979 (No copies furnished by DTIC).

No abstract available.

LBL-9300 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Empirical Method That Provides a Basis for the Organization of Relaxation Labeling Processes for Vision.
F. S. Montalvo, and N. Weisstein. Jun 79, 4p
CONF-790824-3
Contract W-7405-ENG-48
International joint conference on artificial intelligence, Tokyo, Japan, 20 Aug 1979.

Relaxation labeling is a technique used in computer vision which parallels the operation of human vision. Weisstein et al. have developed an experimental method for investigating higher-level processes while maintaining a close tie to the underlying brain structure. Here the authors demonstrate that because of the close correspondence between relaxation labeling processes and neural network processes, the experimental results provide a basis for the design of relaxation labeling processes for vision. (ERA citation 04:052204)

6Q. Protective Equipment

AD-A076 061/1 PC **A04**/MF **A01**
Douglas Aircraft Co Long Beach Ca
Advanced Design Aircrew Protective Restraint Systems.
Final rept.,
A. Blair McDonald. Aug 79, 59p AMRL-TR-79-45
Contract F33615-78-C-0509

This study is the initial phase of a program aimed at the development of advanced design aircrew systems for the next generation of Air Force combat aircraft. For these new aircraft, it is anticipated that combat operations will involve high multiaxial acceleration maneuvers and that new aircrew systems will be required for restraint, protection and escape under these combat conditions.

AD-A076 325/0 PC **A04**/MF **A01**
Army Command and General Staff Coll Fort Leavenworth Ks
Lightweight Pilot Helmets: The Issue of Weight Versus Protection.
Final rept.,
Richard W. Himmel. 8 Jun 79, 58p
Master's thesis.

This study addresses the problem of reducing the weight of pilot helmets while retaining relevant protective qualities. Existing helmet development standards are synthesized and compared in light of compatability, objectivity and standardization. The issue of decreased protection, as a result of weight reduction, is discussed in view of pilot opinion, accident experience, contemporary reserach and recent compromises in helmet development. The investigation reveals distinct ambiguities in helmet development standards and incongruities between standards. The study recommends the deletion of penetration standards since they are incompatible with imapct standards and prevent industry from using new materials to achieve light weight. Further, the study proposes a change to military specification MIL-H-83147 (USAF) that reflects the deletion of penetration standards and recognizes current technological developments. (Authro)

AD-A076 331/8 PC **A05**/MF **A01**
Stencel Aero Engineering Corp Asheville N C
Prototype Development Passive, Seat-Mounted Limb Retention System.
Final rept. Sep 77-May 79.
May 79, 90p NADC-79201-60
Contract N62269-77-C-0251

It has been well documented that the predominant cause of injury (both major and minor) occurring from combat ejections during the Southeast Asia conflict was due to flailing of the extremities as a result of increased ejection speed. A prototype passive seat mounted limb retention system was developed and manufactured which does not require the aircrewman to wear any additional devices or fasten additional restraint connections. It will not, in any way, compromise his movement in the cockpit or his control of the aircraft. This functional prototype device will undergo feasibility testing to determine acceptability for further development. (Author)

BMFT-FBHA-79-04 PC **A04**/MF **A01**
Ruhrkohle, A.G., Essen (Germany, F.R.).
Ear Protection Devices with Special Regard to Their Suitability in Underground Mines.
H. J. Asch, K. Heine, H. J. Huske, J. Schulte, and P. Zoels. May 79, 60p
In German.
U.S. Sales Only.

The fact that in 1974 there was not yet available any ear portection device specifically adapted to the use in underground coal mines, induced Ruhrkohle AG to carry out a project called "Ear Protection Devices with Special Regard to Their Suitability in Underground Mines," from July 1st, 1974 through June 30th, 1976. According to the objectives of the project, two devices were tested and developed on the basis of a list of requirements, i.e., the otoplastic device, Peacekeeper, and a polymer foam ear stop EAR which both had been retained among the devices in the market in 1974. The investigations, i.e., determination of physical, chemical, and bacteriological properties, wear tests and subsequent interviews with more than 300 individuals, had in view both objective and subjective features (comfort of wear, intellegibility of speech, and signals). From the test results the modified and wrapped polymer foam stop EAR seems to be a protecive device which may be widely used even with the difficult conditions prevailing in underground coal mines, whereas the use of the Peacekeeper should be limited to special situations or categories of persons. The wrapped ear stop has thus been a clear improvement compared with the protective devices used hitherto in underground mines. Moreover, the use of the wrapped ear stops is recommended also for work places in comparably difficult conditions outside the coal industry. (ERA citation 04:049470)

6R. Radiobiology

AD-A075 910/0 PC **A02**/MF **A01**
Armed Forces Radiobiology Research Inst Bethesda Md
Reduction of the Indigenous Filamentous Microorganisms in Rat Ilea Following gamma-Radiation,
M. Porvaznik , R. I. Walker , and J. D. Gillmore. 1979, 9p
Pub. in Scanning Electron Microscopy, v3 p15-21 1979.

No abstract available.

AD-A075 916/7 PC **A02**/MF **A01**
Walter Reed Army Inst of Research Washington Dc
A Microwave Compatible MIC Temperature Electrode for Use in Biological Dielectrics,
Lawrence E. Larsen , Robert A. Moore , John H. Jacobi , F. A. Halgas , and P. V. Brown. 9 Aug 78, 9p
Pub. in IEEE Transactions on Microwave Theory and Techniques, vMTT-27 n7 p673-679 Jul 79. Presented at the USNC International Union of Radio Science Annual Meeting (1976), Amherst, MA.

No abstract available.

AD-A075 927/4 PC **A02**/MF **A01**
Armed Forces Radiobiology Research Inst Bethesda Md
Preliminary Observations on the Potential of 99mTc-Sulfur Colloid as a Radiopharmaceutical for Detection of Deep Vein Thrombosis,
Frank Vieras , and Edward L. Barron. 1979, 3p
Pub. in Radiology, v132 n2 p473-474 Aug 79.

No abstract available.

AD-A076 311/0 PC **A05**/MF **A01**
School of Aerospace Medicine Brooks AFB Tx
Lesion Duration and Curvature Change in the Cornea Following Exposure to a Carbon Dioxide Laser.
Final rept. Jul 76-Jun 78,
George W. Mikesell, Jr. , Everett O. Richey , John Taboada , Richard C. McNee , and Bruce R. Anderson. Oct 79, 93p Rept no. SAM-TR-79-26

The corneas of Dutch belted rabbits were exposed for 0.5 sec to the radiation from a carbon dioxide laser (lambda = 10.6 microns) emitting a Gaussian beam with a 1/e radius of r = sigma = 2.65 mm at the corneal plane. The 1/e radiant exposure required for a 50% probability (ED50) of producing a minimum visible lesion within 30 minutes postexposure was 4.71 J/sq cm. The 1/e radiant exposure is the incident beam energy delivered in 0.5 sec divided by the area of a circle of radius r = 2.65 mm, the beam radius at the 1/e point. Corneas with lesions resulting from suprathreshold exposures were examined at specified intervals for 1 year postexposure and the ED50 determined as a function of lesion duration. Two methods for assessing permanent corneal damage clinically are discussed and compared. Pre- and postexposure corneal curvature measurements made during a year of observations show that the curvature of the irradiated corneas decreased by a factor of 2 to 3 over those in a nonirradiated control group. Randomly recurring postexposure edema in many irradiated corneas caused curvature increases which tended to mask the decrease expected from corneal collagen shrinkage. Mechanisms which could affect the results of this and other studies are presented. Parallels between induced corneal curvature changes and resulting changes in refractive error and visual performance are presented and evaluated. (Author)

AD-A076 323/5 PC **A02**/MF **A01**
Army Inst of Dental Research Washington D C
Effects of Carbon Dioxide Laser Radiation on Bone. An Initial Report,
Gary W. Allen , and James C. Adrian. 17 Oct 79, 11p

A study of the effects of carbon dioxide laser radiation on bone was conducted. Results indicated that wounds produced by a carbon dioxide laser have a retarded rate of healing when comparable size produced by a surgical bur. The retarded healing is probably due to the presence of a black, carbonaceous surface material resulting from the thermal effects of laser radiation. (Author)

BNL-26069 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Response to and Recovery from Acute Sublethal gamma Radiation in the Amazon Molly, Poecilia Formosa.
A. D. Woodhead, and R. B. Setlow. May 79, 25p
CONF-790562-1
Contract EY-76-C-02-0016
Radiation effects on aquatic organisms, Tokyo, Japan, May 1979.

Acute irradiation of the Amazon molly with a sublethal dose of 1,000 rad caused some damage to the intestinal tract and to the haematopoietic system. Histologically, the intestine appeared to have regenerated by the end of a week; damage to the haematopoietic tissue appeared more slowly, but repair was almost complete some two months

later. Nevertheless, recovery to the intestine cannot have been entirely completed in seven days, since the fish did not feed well for the following two weeks. After this, there were no obvious deleterious effects upon the survival and viability of the fish, although irradiated fish weighed less at the termination of the experiment. (ERA citation 04:049260)

BNL-26222 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Photoenzyme Probes of Photodamage to Cells and Cellular DNA.
B. M. Sutherland. 1979, 19p CONF-790584-1
Contract EY-76-C-02-0016
Applications of photochemistry in probing biological targets conference, New York, NY, USA, 30 May 1979.

Development of photoenzyme probes for detection of ultraviolet damage to cells and DNA is reviewed with special emphasis on a process using polyethylene glycol to induce cell fusion. Polyethylene glycol is easy to obtain and handle, is gentle to the cells and does not induce latent or productive virus infection; therefore, it may be a general method for insertion of exogenous enzymes into mammalian cells. (ERA citation 04:052238)

BNL-26454 PC **A03**/MF **A01**
Brookhaven National Lab., Upton, NY.
Relationship of DNA Lesions and Their Repair to Chromosomal Aberration Production.
M. A. Bender. 1979, 36p CONF-790676-4
Contract EY-76-C-02-0016
Conference on DNA repair and mutagenesis in bacteria, Atlanta, GA, USA, 25 Jun 1979.

Recent work on the roles of specific kinds of DNA lesions and their enzymatic repair systems in the production of chromosomal aberrations seems consistent with a simple molecular model of chromosomal aberrations formation. Evidence from experiments with the human repair-deficient genetic diseases xeroderma pigmentosom, ataxia telangiectasia, and Fanconi's anemia is reviewed in the light of the contributions to aberration production of single and double polynucleotide strand breaks, base damage, polynucleotide strand crosslinks, and pyrimidine cyclobutane dimers. (ERA citation 04:052206)

CONF-790486-6 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Radiation Toxicology.
R. J. M. Fry, J. B. Storer, and R. L. Ullrich. 1979, 26p
Contracts W-31-109-ENG-38, W-7405-ENG-26
Biology division research conference on the scientific basis of toxicity assessment, Gatlinburg, TN, USA, 15 Apr 1979.

The extensive studies on both human and experimental animal populations have provided information that allows radiation protection standards to be set with greater confidence than for most if not all other carcinogenic agents. Furthermore, both international and national advisory bodies are continually updating the risk estimates and the standards as new information is available. However, it is clear that we need models that take into account the multistage nature of carcinogenesis. Studies in both ionizing and ultraviolet radiation carcinogenesis are more valuable to the general problem of elucidating the mechanisms involved in cancer than is indicated by the amount of work or support for this field of research. (ERA citation 04:052208)

CONF-790676-2 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Repair in Fertilized Eggs of Mice and Its Role in the Production of Chromosomal Aberrations.
W. M. Generoso. 1979, 18p
Contract W-7405-ENG-26
Conference on DNA repair and mutagenesis in bacteria, Atlanta, GA, USA, 25 Jun 1979.

The fertilized egg may influence the yield of dominant-lethal mutations produced from chemical treatment of male postmeiotic germ cells to a small or large extent depending upon the mutagen used and the competence of the egg to repair the premutational lesions induced. The strain of females has small influence on the yield of dominant-lethal mutations induced by TEM or EMS in spermatids and spermatozoa. On the contrary, it has large influence in the case of IMS. In addition to this difference, TEM and EMS induce high levels of heritable translocations at these germ cell stages while IMS is practically ineffective even though doses of these chemicals used produced comparable levels of dominant-lethal mutations. These differences between EMS and TEM on one hand and IMS on the other, were explained as a function of the types of chromosomal lesions present at the time of repair activity and whether or not chromosomal aberrations are already fixed at the time of postfertilization pronuclear DNA synthesis. (ERA citation 04:049261)

CONF-790676-5 PC **A03**/MF **A01**
California Univ., San Francisco.
Radiation- and Drug-Induced DNA Repair in Mammalian Oocytes and Embryos.
R. A. Pedersen, and B. Brandriff. 1979, 39p
Contract EY-76-C-03-1012
Conference on DNA repair and mutagenesis in bacteria, Atlanta, GA, USA, 25 Jun 1979.

A review of studies showing ultraviolet- or drug-induced unscheduled DNA synthesis in mammalian oocytes and embryos suggests that the female gamete has an excision repair capacity from the earliest stages of oocyte growth. The oocyte's demonstrable excision repair capacity decreases at the time of meiotic maturation for unknown reasons, but the fully mature oocyte maintans a repair capacity, in contrast to the mature sperm, and contributes this to the zygote. Early embryo cells maintain relatively constant levels of excision repair until late fetal stages, when they lose their capacity for excision repair. These apparent changes in excision repair capacity do not have a simple relationship to known differences in radiation sensitivity of germ cells and embryos. (ERA citation 04:052216)

COO-3221-56 PC **A02**/MF **A01**
Hebrew Univ., Jerusalem (Israel).
Radiation-Induced Damage in E. Coli B: The Effect of Superoxide Radicals and Molecular Oxygen. Progress Report, December 1, 1978--November 30, 1979.
A. Samuni, and G. Czapski. 20p
Contract EY-76-C-02-3221

The roles of superoxide radicals and of molecular oxygen in the radiodamage of E. coli B suspended in dilute phosphate buffer were studied. The presence of high concentrations of polyethylene glycol in the gamma -irradiated cell suspensions, had no effect on bacterial radiosensitivity. This indicates that the damage was primarily endogenous, i.e. originated intracellularly. Saturation of the cell suspensions with N sub 2 O doubled the radiosensitivity, thus indicating that OH radicals are responsible for the majority of the damage (indirect radiation effect). The presence of oxygen either in the absence or presence of N sub 2 O brought about roughly a three-fold increase in the radiosensitivity. Since in the presence of N sub 2 O all e exp - /sub aq/ are scavenged by the nitrous oxide rather than by oxygen, this shows that superoxide radicals play no role in the bacterial radiodamage. The results substantiate the attribution of the oxygen effect to a direct interaction of O sub 2 with the hydroxyl-radical-damaged sites on vital biomolecules, and exclude any significant contribution of e exp - /sub aq/ and superoxide radicals to the cellular radiodamage. (ERA citation 04:052207)

COO-3380-T1 PC **A02**/MF **A01**
New York Univ., NY. Dept. of Environmental Medicine.
Tumorigenic Action of beta, Proton, alpha and Electron Radiation on the Rat Skin. Progress Report, August 1, 1977--January 31, 1979.
F. J. Burns, and R. E. Albert. 1979, 20p
Contract EY-76-S-02-3380

Epithelial tumors are induced reproducibly in rat skin exposed to ionizing radiation, ultraviolet light, or polycyclic aromatic hydrocarbons. For these carcinogens, the comparative risk of tumor formation is being examined for clues to the generality of action and the mode of interaction of diverse carcinogens. Molecular lesions, such as, pyrimidine dimers and single-strand breaks in DNA have been measured as a basis for assessment of cellular dose. Dose-response for single doses, time-response for multiple doses, and repair or recovery of oncogenic damage are major areas of current interest. (ERA citation 04:052217)

EPRI-ER-651 PC **A04**/MF **A01**
Black and Veatch, Kansas City, MO.
Physiological Effects of Redirected Solar Radiation.
W. T. Ham, Jr., and D. H. Sliney. Aug 78, 53p

The findings of an investigation into the potential hazards from redirected solar radiation from heliostats used in a solar thermal power facility are presented. Using high intensity optical sources to simulate the solar spectrum, hazards to skin and eyes are defined by wavelength in an attempt to establish burn thresholds, and thus to determine limits of exposure and restricted occupancy areas at the facility. (ERA citation 04:025858)

LBL-8850 PC **A03**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Degeneration and Regeneration of the Spermatogonial Stem-Cell System after Exposure to Ionizing Radiation.
J. I. Fabrikant. Feb 79, 27p CONF-790524-1
Contract W-7405-ENG-48
International congress symposium on radiation research and stem cells, Tokyo, Japan, 13 May 1979.

Under continuous low level irradiation at 1.8 rad/day which will permit the survival of at least 10 generations in the mouse, cell renewal during spermatogenesis can achieve a near-steady state of cell population at approx. 80% of control levels for at least 12 cycles of spermatogonial cell renewal and 3 cycles of the seminiferous epithelium. Changes in the patterns of spermatogonial cell population kinetics indicate that there is some limited reserve of proliferative capacity, and the extent to which these changes may be due to decreasing the cell cycle time of a long-cycling type A/sub s/ stem-cell population in the type A cell compartment, or the bringing-in of a potentially proliferative type A/sub s/ population is now more clearly understood. These mechanisms are important in maintaining the steady-state of spermatogonial cell renewal under stress. The autoradiographic data indicate that under low level irradiation there are delays in the flow of the differentiated types A/sub 1-4/, intermediate, and type B spermatogonia in each proliferative subcompartment through the postsynthetic G sub 2 period into cell division, associated with a decrease in the duration of DNA synthesis, but with relatively normal cell cycle times. Under continuous exposure to low level irradiation, there is a differential radiosensitivity among the differentiated types A sub 1 to A sub 4 , In and B cells affecting proliferation - depopulation is minimal but evident in type B and in cells, much less among types A/sub 1-4/ cells and preleptotene spermatocytes, and least in the type A/sub s/ stem-cell compartment. (ERA citation 04:045434)

NTISUB/E/120 Standing Order
Joint Publications Research Service, Arlington, VA.
Radiobiology, Volume XIX.
Bimonthly repts.
1979, 6 issues
Trans. of Radiobiologiya (USSR) v19 1979. Sponsored in part by Department of Energy, Oak Ridge, TN. Technical Information Center.
Paper copy available on Standing Order, Deposit Account required. North American Continent price $10.50/each issue; all others write for quote. Single copies also available in paper or microfiche.

The main subjects of experimental works published in this journal are--primary and initial mechanisms of biological effects of ionizing radiation, physical, physicochemical and biochemical patterns of biological effects of radiation; effects of radiation on physiological processes and morphological distinctions of irradiated objects; radiation genetics; radiation ecology, theoretical bases of biological protection from the deleterious effects of ionizing radiation and postradiation recovery; distinctions of manifestation of effects of pharmacological, toxic and infectious agents in the irradiated organism; techniques used in radiobiological experimentation; applications of ionizing radiation in agriculture and the biological industry.

NUREG/CR-0150-V-2 PC **A22**/MF **A01**
Oak Ridge National Lab., TN.
Estimates of Internal Dose Equivalent to 22 Target Organs for Radionuclides Occurring in Routine Releases from Nuclear Fuel-Cycle Facilities. Volume II,
D. E. Dunning, Jr., S. R. Bernard, P. J. Walsh, G. G. Killough, and J. C. Pleasant. Nov 79, 503p ORNL/NUREG/TM-190-VOL-2
Contract W-7405-eng-26
See also Volume 1, ORNL/NUREG/TM-190. Prepared in cooperation with East Tennessee State Univ., Johnson City.

The report is the second of a two-volume tabulation of internal radiation dose conversion factors for man for radionuclides of interest in environmental assessments of light-water-reactor fuel cycles. This volume treats 78 radionuclides, all of mass number greater than 200. Intake by inhalation and ingestion are considered. Retention of radionuclides in other organs is characterized by linear combinations of decaying exponential functions. Specific computational details in which the present calculations depart from the general methodologies presented in the previous volume of this series are discussed.

NUREG/CR-1004 PC **A09**/MF **A01**
Oak Ridge National Lab., TN.
A Statistical Analysis of Selected Parameters for Predicting Food Chain Transport and Internal Dose of Radionuclides.
Final rept.,
F. Owen Hoffman, Charles F. Baes, III, Donald E. Dunning, Jr., David E. Fields, and Craig A. Little. Nov 79, 200p ORNL/NUREG/TM-282
Contract W-7405-eng-25

Compliance with environmental radiological standards that limit routine releases from nuclear facilities is usually determined through the use of mathematical models. These are subject to considerable uncertainty. One way of estimating the uncertainty associated with model predictions is through an analysis of the statistical properties of their input parameters. This report presents results of such analyses for parameters incorporated in U.S. Nuclear Regulatory Commission (NRC) Regulatory Guide 1.109. Approximately 200 references are reviewed and the distribution of results are used to estimate the uncertainty in dose prediction resulting from a given concentration of 131I2 in air transported over the pasture-cow-milk pathway. The NRC recommended generic default values are compared with the statistical distribution of the selected parameters, and the probability of the default values not being exceeded is estimated. The results reported herein provide an estimation of actual uncertainties to be expected under real-world conditions in lieu of validation experiments. The relevance of these results is limited because of the qualifying assumption and the quality of data. Methods of taking results from these analyses into account when determining compliance with regulatory statutes are discussed.

NUREG/CR-1055 PC **A03**/MF **A01**
Los Alamos Scientific Lab., NM.
Criteria and Test Methods for Certifying Air-Purifying Respirators Against Radioiodine.
Rept. for 1 Oct 76-30 Sep 78,
Gerry O. Wood, Gerald J. Vogt, Douglas C. Gray, and Claudine A. Kasunic. Nov 79, 35p LA-8029-PR
Contract W-7405-eng-36

A project has been initiated to provide a standard test procedure to define the effectiveness of air-purifying respirator cartridges or canisters for airborne radioiodine. The information, procedures, and apparatus designs will provide the means by which air-purifying respirators can be approved for this application. A considerable body of published and private information was surveyed to define the nature of the radioiodine challenge and the requirements of a respirator cartridge to protect against it.

NUREG-0594 PC **A06**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Management and Program Analysis.
Occupational Radiation Exposure at Commercial Nuclear Power Reactors, 1978.
Annual rept.,
Barbara G. Brooks. Nov 79, 119p

The report summarizes the occupational radiation exposure information that has been reported to the U.S.N.R.C. by commercial nuclear power reactors during the years 1969 through 1978. The bulk of the data presented in the report was obtained from annual radiation exposure reports submitted in accordance with the requirements of 10 CFR 20.407 and Regulatory Guide 1.16. The reports submitted by the 64 nuclear power plants that had completed at least one full year of operation as of December 31, 1978, indicated that the number of personnel monitored during 1978 was 76,121 persons, and the annual collective dose incurred by these individuals was 31,806 man-rems. The average annual dose for each worker that received a measurable dose was 0.7 rems, and the average collective dose per reactor was 497 man-rems.

ORNL/TM-6571 PC **A04**/MF **A01**
Oak Ridge National Lab., TN.
INGDOS: A Conversational Computer Code to Implement US Nuclear Regulatory Commission Regulatory Guide 1.109 Models for Estimation of Annual Doses from Ingestion of Atmospherically Released Radionuclides in Foods.
J. C. Pleasant. Aug 79, 68p
Contract W-7405-ENG-26

INGDOS is a conversational FORTRAN IV program which utilizes models described in U.S. Nuclear Regulatory Commission Regulatory Guide 1.109 for calculating: (1) concentrations of airborne radionuclides in foods; and (2) annual doses to various organs of man from ingestion of foods contaminated by radionuclides released to the atmosphere. An exception to the implementation of models described in the Regulatory Guide is the adoption of other previously described models for estimation of doses for exp 3 H and exp 14 C. An on-line data base provides default values for most of the parameters required in the calculation of these quantities. In most cases the program allows the user to change any of these values for a particular run. With the exception of exp 3 H and exp 14 C, the calculation of nuclide concentrations in and on vegetation at a given location is based on the rate of deposition of the nuclide at the given location, which is the product of the ground-level air concentration and the deposition velocity of the nuclide. The last two quantities must be supplied by the user of the code for each nuclide other than exp 3 H or exp 14 C involved in the run. As output from INGDOS, the user may have any (or all) of 11 tables printed which specify nuclide concentrations and annual organ doses via various pathways as well as certain ratios involving these quantities. The models for calculating nuclide concentrations and organ doses are discussed, and information is provided concerning the use of the code and its data base. (ERA citation 04:052219)

ORO-4568-20 PC **A02**/MF **A01**
Tennessee Univ., Knoxville.
Repair and Cell Cycle Response in Cells Exposed to Environmental Biohazards. Progress Report, October 1, 1976--May 31, 1979.
D. Billen. 1979, 16p
Contract EY-76-S-05-4568

A wide variety of environmental agents are known which induce damage in DNA leading to an inhibition of DNA synthesis or faulty replication. Both results may cause cell death or mutation. Both bacteria and mammalian cells are being used to assess the roles of the several known DNA polymerases and other DNA metabolic enzymes and factors in DNA repair, replication and recombination. The many DNA mutants of E. coli and B. subtilis provide a genetic approach to measuring the role of individual components of the DNA repair and replicative system. Because of the advantage of controlling pools and precursors of nucleic acid synthesis we have further developed the use of permeabilized cells for such studies. In addition a series of repair studies with Bacillus subtilis have been carried on because of the unique genetic manipulation of this system which includes the ability of cells to be easily transformed by exogenous DNA. The information obtained with prokaryotes provides leads to assess the details of DNA repair and replication in mammalian systems including man. (ERA citation 04:052218)

PNL-2898 PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Environmental Radon and Radon Daughter Dosimetry in the Respiratory Tract.
R. B. McPherson. Apr 79, 24p
Contract EY-76-C-06-1830

This report describes work performed by Pacific Northwest Laboratory (PNL) for the Nuclear Regulatory Commission's program to determine safety and costs related to decommissioning nuclear fuel cycle facilities. Individual dose factors for the inhalation of radon and its daughter products are calculated for use in environmental dose assessments. The calculated committed dose equivalent factors for exp 222 Rn and its daughters are tabulated for lungs, bronchi tract and other organs. An activity median aerodynamic diameter of 0.1 mu m was used. The dose to an individual is calculated by multiplying the estimated intake from inhalation for a particular radionuclide by the corresponding dose factor. A working level month-to-dose conversion factor is calculated to be 1 rad/WLM to the epithelial tissue of the T-B region, assuming 100% daughter equilibrium and 10% free exp 218 Po ions. This value is in reasonable agreement with recently reported values. (ERA citation 04:052209)

RERF-TR-12-77 PC **A03**/MF **A01**
Radiation Effects Research Foundation, Nagasaki (Japan). Nagasaki Branch.
Relationship Between Dose and Chromosome Aberrations in Atomic Bomb Survivors, Hiroshima and Nagasaki.
A. A. Awa, T. Sofuni, T. Honda, M. Itoh, and S. Neriishi. Jun 78, 26p
Contract EX-76-C-28-3161
In Japanese and English.

Radiation-induced chromosome aberrations were found to persist in cultured peripheral blood lymphocytes derived from Hiroshima and Nagasaki A-bomb survivors long after their radiation exposure. Earlier observations that the frequency of cells with chromosome aberrations increased in proportion with increasing dose in both cities were reconfirmed. However, in every dose group, the frequency of aberrant cells was consistently higher in Hiroshima than in Nagasaki. Results suggesteed that a higher neutron dose in Hiroshima than in Nagasaki may have been a major component contributing to the difference in dose response between the two cities. Among the types of chromosome aberrations so far identified, reciprocal translocations were observed to predominate, and they played an important role in determining the dose-aberration relationship. Furthermore, it was recognized that symmetric chromosome exchanges seem to be a useful index of late radiation effects on somatic cells in vivo. (ERA citation 04:052211)

RERF-TR-13-77 PC **A02**/MF **A01**
Radiation Effects Research Foundation, Nagasaki (Japan). Nagasaki Branch.
G-Banding Analysis of Chromosome Aberrations in Hiroshima Atomic Bomb Survivors.
T. Sofuni, H. Shimba, K. Ohtaki, and A. A. Awa. Jan 78, 10p
Contract EX-76-C-28-3161
IN Japanese and English.

A total of 896 metaphases obtained from 2-day culture of peripheral blood lymphocytes of 23 heavily exposed atomic bomb survivors of Hiroshima were examined first by an ordinary staining method, and then reexamined after trypsin-G-banding stain. There were 348 metaphases identified as having abnormal karyo-types by either one or both methods. Of these aberrant cells, 293 were found to have chromosome aberrations by the ordinary stain, and 6 of the 293 were identified as normal by G-banding stain, 4 of which were misjudged in the ordinary preparation due to the presence of partially distorted chromosomes. Furthermore, there were 55 metaphases in which abnormalities were detected only by G-banding, including paracentric inversions, and intra- and interchanges of chromosome segments with equal lengths. (ERA citation 04:052212)

6S. Stress Physiology

AD-A075 626/2 Not available NTIS
Naval Submarine Medical Research Lab Groton Ct

Effect of 18-h Watch Schedules on Circadian Cycles of Physiological Functions during Submarine Patrols,
K. E. Schaefer , C. M. Kerr , D. Buss , and E. Haus. Oct 78, 10p Rept no. NSMRL-881
Availability: Pub. in Undersea Biomedical Research, Submarine Supplement, pS81-S90 1979 (No copies furnished by DTIC).

No abstract available.

AD-A075 629/6 Not available NTIS
Flying Personnel Research Committee London (England)
Experiments on the Detection of Roll Motion,
A. J. Gundry. Apr 78, 11p Rept no. FPRC/1372
Availability: Pub. in Aviation, Space and Environmental Medicine, v49 n5 p657-664 May 78 (No copies furnished by DTIC).

No abstract available.

AD-A075 635/3 Not available NTIS
Defence and Civil Inst of Environmental Medicine Downsview (Ontario)
Mechanism of Lung Damage in Explosive Decompression,
E. D. L. Topliff. 1976, 6p Rept no. DCIEM-73-RP-992
Availability: Pub. in Aviation, Space and Environmental Medicine, v47 n5 p517-522 1976 (no copies furnished by DTIC).

No abstract available.

AD-A075 637/9 Not available NTIS
Defence and Civil Inst of Environmental Medicine Downsview (Ontario)
Cold-Induced Shivering in Men with Thermoneutral Skin Temperatures.
A. G. C. Buguet , S. D. Livingstone , L. D. Reed , and R. E. Limmer. 26 Nov 75, 5p Rept no. DCIEM-PUB-75-X-9
Availability: Pub. in Jnl. of Applied Physiology, v41 n2 p142-145 Aug 76 (No copies furnished by DTIC).

No abstract available.

AD-A075 675/9 PC **A02**/MF **A01**
Princeton Univ N J Dept of Psychology
Sensory Deprivation.
Progress rept. no. 1, 1 Sep-1 Dec 55,
Jack A. Vernon. 1 Dec 55, 15p
Contract DA-49-007-MO-671

The content and purpose of the following report is to present a classification of the research projects which are planned. In each case the procedure for the conduct of the project is indicated. In most cases the rationale for including the project is indicated. The research plans included in the enclosed report cover the major efforts on this research contract for the period 1 September 1955 to 1 December 1955. (Author)

AD-A075 676/7 PC **A02**/MF **A01**
Princeton Univ N J Dept of Psychology
Sensory Deprivation.
Progress rept. no. 2, 1 Dec 55-1 Mar 56,
Jack A. Vernon. 1 Mar 56, 6p
Contract DA-49-007-MO-671

Data collected on two subjects placed in deprivation for 72 hours each reveal: (A) The learining of auditory adjective lists showed little improvement probably because the learning task was too simple. Future tasks will be more difficult. (B) Ss spend a great deal of time during confinement rehearsing the learning tasks so that savings scores on relearning reveal the greatest retention of the material for which there has been the longest opportunity to rehearse. Steps are being taken to prevent rehearsal by a decoy technique. (C) Data for suggestion as revealed by a Body Sway Test are given. Conclusions not yet possible. (D) Data for eye wink conditioning given; conclusions not yet possible. (E) Data for concept learning: auditory, visual, and tactual given. Conclusions not yet possible except that the order of difficulty seems to be auditory most difficult, visual next, and tactual last. (F) One S reports hallucinations - visual in nature. The other S reports the possible occurrence of auditory hallucinations.

AD-A075 677/5 PC **A02**/MF **A01**
Princeton Univ N J Dept of Psychology
Sensory Deprivation.
Progress rept. no. 3, 1 Mar-1 Jun 56,
Jack A. Vernon. 1 Jun 56, 7p
Contract DA-48-007-MO-671

The data in the following report were collected on four subjects: S-3, S-4, S-5, and S-6. Each S was subjected to 72 hours of sensory deprivation, with the exception of S-3. A. The learning of the auditory adjective lists showed a fair amount of improvement some of which appears to be permanent. Fifteen-item lists were employed. B. Instructions were given with the purpose of minimizing rehearsal of the adjective lists during confinement. As the savings scores and reports of the subjects show, these instructions were effective. C. Decoy material for Ss to 'work on' during confinement has been introduced. These data are not yet ready for presentation and will not appear until control data are available. D. Data for the Body Sway Test of Suggestibility are presented. A new project under the area of Suggestion is introduced. E. Data for the concept formation problems are presented. Conclusions about these data await control data. F. The nature and description of hallucinations are included. Two Ss report visual hallucinations, but there are no reports of auditory hallucinations. G. One subject (S-3) was unable to remain in confinement. A discussion of his interview is included.

AD-A075 678/3 PC **A02**/MF **A01**
Utah Univ Salt Lake City Dept of Anatomy
Studies of the Mechanisms of Resistance to Stress.
Rept. for 1 Dec 56-1 Dec 57,
Thomas F. Dougherty. 1 Dec 57, 18p
Contract DA-49-007-MD-130

The roles of histamine and heparin in the tissues are fundamental in the maintenance of the physiologic state. Heparin binds relatively large amounts of tissue histamine (mast cells) and in this state can serve as a readily available substance to bind with other agents for which it has a stronger affinity (e.g., histamine releasers). The toxicity of histamine can vary according to the amount of histamine released as well as to the conditions of release. It has been shown in this study that histamine is markedly more toxic in the presence of other tissue amines than when alone. Likewise, the toxicity of a histamine releaser is related to the amount of heparin available to bind with it. Therefore, the response of an organism or its tissues to a given amount of a stress stimuli is related to numerous factors and the response can be lacking (tolerance) or exaggerated (hypersensitivity). Specific therapy directed to any one component of the stress-producing complex may be sufficient to alleviate the stress situation. Thus many agents, antihistaminics, adrenocortical hormones, heparin, etc., may serve as anti-stress substances - each acting in its own specific capacity. It is therefore considered important to explore the nature of their respective activities. In this way, the therapeutic values of these drugs can be exploited more specifically and therefore, more effectively. (Author)

AD-A075 903/5 PC **A02**/MF **A01**
Army Research Inst of Environmental Medicine Natick Ma
The Role of Clothing in Modifying the Human Thermal Comfort Range,
Ralph F. Goldman. Mar 78, 18p Rept no. USARIEM-M-19/78
Pub. in Inserm, v75 p163-176 Dec 77. Supersedes AD-A054 054.

No abstract available.

AD-A076 039/7 PC **A03**/MF **A01**
Wright Air Development Center Wright-Patterson AFB Oh
The Effect on Moderate Altitude UPON Human Gastric Emptying Time.
Technical rept.,
Margaret M. Jackson , Everett Shocket , and Harry C. Dyme. Mar 52, 26p Rept no. WADC-TR-52-74

The effect of moderate altitude upon the motility of the human stomach has been studied in volunteer subjects. The time required for complete gastric emptying of a standard radiopaque meal has been determined by serial roentgenograms. No significant difference in human gastric emptying time was detected between the experiments conducted at ground level and those conducted at moderate altitude. (12,500 feet to 15,000 feet). (Author)

AD-A076 226/0 Not available NTIS
Naval Submarine Medical Research Lab Groton Ct
Physiological Stresses Related to Hypercapnia during Patrols on Submarines,
K. E. Schaefer. Dec 75, 33p Rept no. NSMRL-799
Summary in French.
Availability: Pub. in Undersea Biomedical Research, Submarine Supplement. Section 1. Patrol Studies, pS15-S47 1979 (No copies furnished by DTIC).

No abstract available.

N80-10745/1 PC **A11**/MF **A01**
National Aeronautics and Space Administration, Washington, D. C.
The Effect of Dynamic Factors of Space Flight on Animal Organisms.
A. M. Genin. Sep 79, 243p NASA-TM-75692
Contract NASW-3199
Tran-Transl. Into English from the Book 'Vliyaniye Dinamicheskikh Faktorov Kosmicheskigo Poleta NA Organizm Zhivotnhy', Moscow, Nauka Press, 1979 p 1-73, 79-148, 165-183, 186-191, 192, 196-217, 219-223, 231, 248. Subm-Transl. By Kanner (Leo) Associates, Redwood City, Calif.

Physiological, biochemical and morphological studies made on the Cosmos-782 biosatellite are presented. Rats, which were exposed on the biosatellite for 19.5 days, were examined immediately after completion of the flight and also during the 25 day period of readaptation to earth's conditions. The effect of factors of space flight, primarily weightlessness, on the organism was investigated for all systems of the body.

N80-10859/0 PC **A04**/MF **A01**
Utah Univ., Salt Lake City.
The Effect of the Duration of Jet Aircraft Flyover Sounds on Judged Annoyance.
K. P. Shepherd. Sep 79, 71p NASA-CR-159132
Grant NSG-1272

The effect of the duration of jet aircraft flyover sounds on humans and the annoyance factor are examined. A nine point numerical category scaling technique is utilized for the study. Changes in the spectral characteristics of aircraft sounds caused by atomospheric attenuation are discussed. The effect of Doppler shifts using aircraft noises with minimal pure tone content is reported. The spectral content of sounds independent of duration and Doppler shift are examined by analysis of variance.

6T. Toxicology

AD-A075 820/1 Not available NTIS
Johns Hopkins Univ Baltimore Md Dept of Microbiology
Membrane Damage by a Toxin from the Sea Anemone 'Stoichactis helianthus.' I. Formation of Transmembrane Channels in Lipid Bilayers,
David W. Michaels. 11 Dec 78, 12p
See also Ad-A075 842.
Availability: Pub. in Biochimica et Biophysica Acta, v555 p67-78 1979 (No copies furnished by DTIC).

No abstract available.

AD-A075 842/5 Not available NTIS
Johns Hopkins Univ Baltimore Md Dept of Microbiology
Membrane Damage by a Toxin from the Sea Anemone 'Stoichacts helianthus'. II. Effect of Membrane Lipid Composition in a Liposome System,
Moon L. Shin , David W. Michaels , and Manfred M. Mayer. 11 Dec 78, 10p
Contracts N00014-75-C-0142, NSF-PCM77-16002
See also Part 1, AD-A075 820.
Availability: Pub. in Biochimica et Biophysica Acta, v555 p79-88 1979 (No copies furnished by DTIC).

No abstract available.

AD-A075 876/3 PC **A04**/MF **A01**
Boston Univ Mass
The Effects of Drug-Induced Alterations of the Autonomic Nervous System on the Responses of Mammals to Oxygen Deprivation.
Technical rept.,
Robert O. Bauer , Eben H. Dustin , George L. Maison , Jacob W. Stutzman , and James T. Gourzis. Jun 52, 58p WADC-TR-52-222
Contract W-33-038-ac-18469
See also Rept. no. MCREXD-696-79H.

The cardiovascular reactions of the mammal to sudden withdrawal of oxygen from the inspired atmosphere include rise of blood pressure and rise of heart rate. While reflexes activating the sympathetic division of the autonomic nervous system are involved in creating these responses, the importance of epinephrine release and of neural activation of arterial musculature in specific areas remain unassessed. With the discovery in recent years of new chemical agents which present with varying specificity abilities to block the autonomic effector paths, the possibility beckons that use of these drugs may elicit basic information about the reaction to oxygen want. Accordingly several hundred experiments were performed in anesthetized dogs and rabbits. Clarification of the mechanisms did not result but certain items of basic information gleaned have been reproduced here in the form of their scientific publication.

AD-A075 905/0 PC **A02**/MF **A01**
Armed Forces Radiobiology Research Inst Bethesda Md
Hematologic Contributions to Increases in Resistance or Sensitivity to Endotoxin,
Richard I. Walker. 1979, 11p
Pub. in Experimental Hematology Today 1979, p55-62 1979.

No abstract available.

AD-A075 976/1 PC **A06**/MF **A01**
California Univ Dayton Oh
Toxic Hazards Research Unit Annual Technical Report: 1979.
Rept. no. 16 Jun 78-May 79,
J. D. MacEwen , and E. H. Vernot. Aug 79, 119p AMRL-TR-79-56
Contract F33615-76-C-5005

The research programs of the Toxic Hazards Research Unit (THRU) for the period of June 1978 through May 1979 are reviewed in this report. Chronic toxicity or oncogenic studies were carried out with inhaled methylcyclohexane, tricyclodecane, and purified 1,1-dimethylhydrazine. A subchronic inhalation study was conducted with decalin. Acute oral and intraperitoneal toxicity studies were conducted on a variety of chemical agents used by the Air Force and Navy. Sensitization, eye, and skin irritation studies were also made on these chemicals. (Author)

AD-A076 302/9 PC **A06**/MF **A01**
Abcor Inc Wilmington Ma Walden Div
Evaluation of Health Effects Data on the Reuse of Shower and Laundry Waters by Field Army Units.
Final rept. 1 Aug-31 Oct 78,
David R. Cogley , Wesley Foy , William G. Light , Marcus Mason , and James C. Eaton, Jr. Apr 79, 123p
Contract DAMD17-78-C-8057

Health effects of short-term shower and laundry water reuse have been assessed in a four task program covering: wastewater composition, engineering evaluation of treatability, toxicity, and previous Army-sponsored research. Available data do not indicate that water reuse would result in toxic effects. It is concluded that the next phase of work to consider is human clinical trials. To assess the reasonableness of such trials, it is recommended that consideration be given to the preparation of five documents, one each on the following topics: the need for and benefits of short-term shower and laundry water reuse, acceptable risks associated with short-term shower and laundry water reuse in a combat situation, acceptable risks for human test subjects in clinical trials of water reuse, a protocol for animal studies designed to assess the possibility of human toxic responses to water reuse, and a protocol for human clinical trials of short-term shower and laundry water reuse. (Author)

AD-A076 321/9 PC **A02**/MF **A01**
Army Environmental Hygiene Agency Aberdeen Proving Ground Md
Topical Hazard Evaluation Program of Candidate Insect Repellent AI3-70735aGa, US Department of Agriculture Proprietary Compound, April 1977 to August 1979.
Final rept.,
Allen W. Singer. 31 Oct 79, 9p Rept no. USAEHA-75-51-0025-80

A preliminary hazard evaluation of AI3-70735aGa was performed by means of laboratory animal studies using rats, rabbits, and guinea pigs. The technical grade compound caused mild corneal irritation and proved to be moderately toxic if ingested. It did not cause any skin or photoirritation and did not sensitize guinea pigs. It was recommended that AI3-70735aGa, USDA Proprietary Compound, be approved for further testing as a candidate insect repellent. (Author)

BNL-26259 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Subcellular Site and Nature of Intracellular Cadmium in Plants.
G. J. Wagner. 1979, 24p CONF-790673-1
Contract EY-76-C-02-0016
13. annual conference on trace substances in environmental health, Columbia, MO, USA, 4 Jun 1979.

The mechanisms underlying heavy metal accumulation, toxicity and tolerance in higher plants are poorly understood. Since subcellular processes are undoubtedly involved in all these phenomena, it is of interest to study the extent of, subcellular site of and nature of intracellularly accumulated cadmium in higher plants. Whole plants supplied exp 109 CdCl sub 2 or exp 112 CdSO sub 4 accumulated Cd into roots and aerial tissues. Preparation of protoplasts from aerial tissue followed by subcellular fractionation of the protoplasts to obtain intact vacuoles, chloroplasts and cytosol revealed the presence of Cd in the cytosol but not in vacuoles or chloroplasts. Particulate materials containing other cell components were also labeled. Of the exp 109 Cd supplied to plants, 2 to 10% was recovered in both cytosol preparations and in particulate materials. Cytosol contained proteinaceous--Cd complexes, free metal and low molecular weight Cd complexes. Labeling of protoplasts gave similar results. No evidence was obtained for the production of volatile Cd complexes in tobacco. (ERA citation 04:050617)

CONF-7810153- PC **A06**/MF **A01**
Department of Energy, Washington, DC.
Proceedings of a Workshop on Fine Particulate Emissions from Fluidized Bed and Conventional Combustion.
Aug 79, 123p
Conference on fire particulate emmissions form fluid bed and conventional combustions, Washington, DC, USA, 23 Oct 1978.

As part of the continuing Program Review process in EV-OHER a small workshop was held on October 23-24, 1978, to review the status of knowledge about potential Health Effects of Fine Particulate Emissions of Advanced versus Conventional Coal Combustion Processes. The major emphasis was placed on progress made in DOE-sponsored research addressing the subject. Similar and complementary efforts of other Federally supported work was discussed. Papers have been entered individually into EDB and ERA. (ERA citation 04:054096)

CONF-790486-1 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Interaction of Platinum Compounds with the Genome: Correlation Between DNA Binding and Biological Effects.
R. O. Rahn, N. P. Johnson, A. W. Hsie, J. F. Lemontt, and W. E. Masker. 1979, 11p
Contract W-7405-ENG-26
Biology division research conference on the scientific basis of toxicity assessment, Gatlinburg, TN, USA, 15 Apr 1979.

Evidence has been presented as to how cis-Pt binds to DNA and causes mutations and cell killing. Inhibition of DNA synthesis is thought to be the major reason why cells treated with cis-Pt die. Because cis-Pt binds to DNA in rat cells up to 10-fold more effectively than trans-Pt and since the cis isomer inhibits DNA synthesis 5-fold more effectively than the trans isomer, then from a simplistic point of view it is relatively easy to see how the cis isomer might be more toxic to an animal cell than the trans isomer. Furthermore, if inhibition of DNA synthesis initiates cell killing, then fast-growing tumor cells are more likely to be affected by Pt than normal nondividing cells. (ERA citation 04:052228)

CONF-790537-2 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
CHO/HGPRT Mutation Assay. IV. Progress with Quantitative Mutagenesis and Mutagen Screening.
A. W. Hsie, J. P. O'Neill, J. R. San Sebastian, and P. A. Brimer. 1979, 25p
Contract W-7405-ENG-26
Cold Spring Harbor symposium on quantitative mammalian cell mutagenesis and mutagen screening, Cold Springs Harbor, NY, USA, 6 May 1979.

Work is summarized on development and application of their mutation system to study mutagenicity of various physical and chemical agents which bear profound environmental concerns. Eleven alkylating chemicals, nineteen heterocyclic nitrogen mustards, nineteen metallic compounds, nineteen miscellaneous compounds were reviewed for mutagencity. Some results remain to be confirmed. Mutagencity of various classes of promutagens were also discussed; including 27 polycyclic aromatic hydrocarbons, 16 nitrosamines, 5 quinoline compounds; 5 aromatic amines and 4 miscellaneous promutagens. (ERA citation 04:052231)

CONF-790569-1 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Toxic Materials Control Program at ORNL Revisited.
E. Ketchen, and W. Porter. May 79, 16p
Contract W-7405-ENG-26
American Industrial Hygiene Association conference, Chicago, IL, USA, 27 May 1979.

Although the 70 to 75% rate for toxic materials control cards (TMCC) could certainly be better, the program has been a success. Before its inception, there was no mechanism for timely identification of chemical users throughout the laboratory. Systematic notification (via stores purchase records) could be delayed by as much as a month. More than two-thirds of the TMCCs are now received by Industrial Hygiene before materials are used. The number and variety of breathing zone samples collected continues to increase. The prompt return of TMCCs to the Industrial Hygiene before materials are used. The number and variety of breathing zone samples collected continues to increase. The prompt return of TMCCs to the Industrial Hygiene Department has allowed contact with the user and has resulted in safe use of the material or in substitution of a less toxic material. (ERA citation 04:052236)

LA-UR-79-1955 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Flow Cytometric Methods for Assaying Damage to Respiratory Tract Cells.
J. A. Steinkamp, and J. S. Wilson. 1979, 12p CONF-790334-12
Contract W-7405-ENG-36
Oil shale symposium, Denver, CO, USA, 26 Mar 1979.

This paper summarizes results of experiments designed to develop automated flow-analysis assay methods for discerning damage to exfoliated respiratory tract cells in model test animals exposed by inhalation to physical and chemical agents associated with the production of synthetic fuels from oil shale, the specific goal being the determination of atypical changes in exposed lung macrophages and epithelial cells. Animals were exposed to oil shale particulates (raw and spent), silica, and ozone, and respiratory tract cells were obtained by lavaging the lungs with normal saline. Cell samples were stained with fluorescent dyes specific for different biochemical parameters and analyzed as they flowed through a chamber intersecting a laser beam(s) of exciting light where sensors measured fluorescence and light scatter (cell size) on a cell-

by-cell basis. Cellular parameters proportional to optical signals were displayed as frequency distribution histograms. Cells also were separated according to cytological features and identified. The basic features of the methodology are presented, along with examples of results that illustrate characterization and analysis of normal and exposed respiratory tract cells based on DNA content, total protein, size, and phagocytic activity. (ERA citation 04:052233)

ORNL/EIS-131 PC **A16**/MF **A01**
Mitre Corp., McLean, VA.
Reviews of the Environmental Effects of Pollutants. XIII. Endrin.
J. Donoso, J. Dorigan, B. Fuller, J. Gordon, and M. Kornreich. Aug 79, 374p EPA-600/1-79-005
Contract W-7405-ENG-26

A comprehensive, multidisciplinary review of the health and environmental effects of endrin (1,2,3,4,10,10-hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-1,4-endo,endo-5,8-dimethanonapthalene) is presented. More than 600 references are cited. Endrin is used chiefly as an insecticide, particularly for the control of lepidopterous larvae that infest cotton crops. In 1971, total US consumption of endrin exceeded 600,000 kg. Endrin is highly toxic to mammals, birds, fish, and insects, but is generally nontoxic to plants. Acute exposure of mammals to endrin typically results in central nervous disorders, with convulsions leading to death through respiratory failure within two days. Symptoms of acute endrin exposure in humans include convulsions, vomiting, abdominal pain, nausea, dizziness, and headaches. Chronic exposure of mammals to endrin may result in damage to the liver, kidney, heart, brain, lung, adrenal gland, and spleen. Behavioral abnormalities, reproductive disorders, changes in carbohydrate metabolism, changes in blood composition, and other effects secondary to central nervous system disorders have also been observed following chronic exposure of mammals to sublethal doses of endrin. No malignancies attributable to endrin have been reported, but chromosomal abnormalities and teratogenesis have been induced in several mammalian species by endrin. Endrin is dissipated from the environment by photochemical and thermal decomposition and by microbial degradation. Relatively few bacteria can degrade endrin, but many species of algae and fungi exhibit this ability. Environmental contamination by endrin appears to be restricted to areas where the compound is used intensively; background concentrations in the atmosphere, hydrosphere, and lithosphere at locations distant from areas of heavy use are generally below the levels of detection. (ERA citation 04:052234)

ORNL/EIS-81 PC **A10**/MF **A01**
Oak Ridge National Lab., TN.
Reviews of the Environmental Effects of Pollutants. V. Cyanide.
L. E. Towill, J. S. Drury, B. L. Whitfield, E. B. Lewis, and E. L. Galyan. Oct 78, 205p EPA-600/1-78-027
Contract W-7405-ENG-26

This study is a comprehensive, multidisciplinary review of the health and environmental effects of cyanide and specific cyanide derivatives. Over 500 references are cited. Cyanide production in the United States was about 700 million pounds in 1975, most of which was used for acrylonitrile production. The most important applications of inorganic cyanides are electroplating and metal treatments. Improper storage, handling, and disposal account for isolated instances of cyanide release to the environment. Tobacco smoke is probably one of the major sources of cyanide exposure to the general public. (ERA citation 04:028112)

PB80-106628 PC **A05**/MF **A01**
Michigan State Univ., East Lansig. Coll. of Human Medicine.
Perturbations in Calcium Homeostatic Mechanisms: A Possible Etiology of Dialysis Encephalopathy.
Annual progress rept. 1 Mar 78-28 Feb 79,
Gilbert H. Mayor. 10 Jun 79, 98p AK-1-8-2206-79
Contract N01-AM-8-2206

Animals fed an aluminum supplemented diet and given exogenous parathyroid hormone (PTH) for periods of up to 84 days have higher aluminum concentrations in brain, kidney bone and heart than animals given PTH alone, the aluminum diet alone or a control diet. Although aluminum concentrations in liver are increased when rats are fed an aluminum diet, PTH did not enhance aluminum content of liver. This fact argues for a specific effect of PTH on aluminum distribution. Withdrawl of PTH results in a rapid egress of aluminum from the brain and whole carcass. Aluminum moves out of brain less rapidly than it does from the whole body. The administration of 25-hydroxycholecafciferol also enhances brain aluminum concentration but 1,25-dihydroxycholecalciferol does not. Further data suggested that elevated concentrations of aluminum in kidney and brain may be toxic to these organs. Aluminum depressed accumulation of p-aminohippurate(PAH). Although, uptake of PAH by slices from rats fed an aluminum containing diet or the aluminum diet and PTH was depressed, chronic ingestion of lower concentrations of aluminum in the diet did not affect renal function. The authors were also able to demonstrate abnormalities in shuttlebox avoidance behavior, as well as depressed open field and motor activity in rats fed aluminum. Some of these effects were potentiated by PTH. Aluminum also inhibited the polymerization of neuronal tubulin to microtubules which further supports the hypothesis that aluminum is a neurotoxin.

PB80-107030 PC **A04**/MF **A01**
Illinois Univ. at the Medical Center, Chicago. School of Public Health.
Model for Measuring the Health Impact from Changing Levels of Ambient Air Pollution: Morbidity Study,
Tsukasa Namekata, Bertram W. Carnow, Zanet Flournoy-Gill, Eileen B. O'Farrell, and Domenic Reda. Aug 79, 74p EPA/600/1-79/024
Contract EPA-68-02-2492

The study quantitatively examines the relationship between human health and ambient air concentrations of the major pollutants in the city of Chicago. This report describes the morbidity analysis in which linear regression models have been developed to quantitatively estimate the degree of the air pollution contribution to emergency room visits for cardiac and respiratory diseases in two major hospitals in the city of Chicago. Based on the significant associations between the pollutants and the disease groups, holding climatological and days-of-week variables constant, the variation due to the pollutant is estimated. According to the results, sulfur dioxide based on patient exposure levels can account for about 13% of the variation of emergency room visits for acute bronchial and lower respiratory infections and about 22% for total cardiac diagnoses. Nitric oxide based on measurements from the closest site to the hospitals can account for about 7% of the variation of visits for total respiratory diagnoses, 6% for allergic conditions and upper respiratory infections, 4% for total cardiac diagnoses and 4% for hypertension and vascular heart diseases. Total suspended particulate, carbon monoxide and ozone do not show significant associations with any disease groups.

PB80-113194 PC **A02**/MF **A01**
General Accounting Office, Washington, DC. Federal Personnel and Compensation Div.
U.S. Ground Troops in South Vietnam Were in Areas Sprayed with Herbicide Orange.
16 Nov 79, 23p FPCD-80/23

Between 1966 and 1969 a large number of U.S. ground troops in Vietnam were in areas sprayed with herbicide orange both during and shortly after spraying. DOD took few precautions to prevent exposure because at that time it did not consider the herbicide to be toxic or dangerous to humans. Marines assigned to units in sprayed areas can be identified, but Army personnel cannot because Army records are incomplete. Troops' actual exposure or the degree of exposure to the herbicide cannot be documented from available records. Also, the long-term efects of exposure remain largely unknown. The Congress should direct DOD, VA, HEW, or the Environmental Protection Agency to determine whether a study is needed of the health effects of herbicide orange on ground troops discussed in this report. GAO issued this report at the request of Senator Charles Percy, Ranking Minority Member of the Permanent Subcommittee on Investigations, Senate Committee on Governmental Affairs.

PB80-802895 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Asbestos and Silicate Pollution. Volume 2, 1977-November, 1979 (Citations from the NTIS Data Base).
Rept. for 1977-Nov 79,
Diane Cavagnaro. Dec 79, 219p
Supersedes NTIS/PS-78/1244, NTIS/PS-77/1075, NTIS/PS-76/0981, NTIS/PS-75/746, and NTIS/PS-75/019. For the companion Published Search of the Engineering Index Data Base, see PB80-802903. See also Volume 1, 1964-1976, NTIS/PS-78/1243.

This bibliography cites Federally-funded research reports on air and water pollution by silica, asbestos, silicates, and silicon dioxide. The citations cover sources, control, detection, and effects on plants, animals, and humans (silicosis, asbestosis, and toxicity). (This updated bibliography contains 212 abstracts, 77 of which are new entries to the previous edition.)

PB80-802903 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Asbestos and Silicate Pollution (Citations from the Engineering Index Data Base).
Rept. for 1970-Nov 79,
Diane M. Cavagnaro. Dec 79, 189p
Supersedes NTIS/PS-78/1245, NTIS/PS-77/1076, and NTIS/PS-76/0982. For the companion Published Searches of the NTIS Data Base, see NTIS/PS-78/1243, and PB80-802895.

The cited reports from a worldwide literature survey relate to detection, control, sampling, and chemical analysis of silicate and asbestos pollution in water, air, and soil. Included are a few citations on the environmental impacts of these chemicals. (This updated bibliography contains 183 abstracts, 8 of which are new entries to the previous edition.)

UCRL-15049 PC **A02**/MF **A01**
California Dept. of Health Services, Berkeley.
Occupational Hazards Associated with Geothermal Energy.
J. L. Hahn. 20 Jul 79, 4p CONF-790906-7
Contract W-7405-ENG-48
Geothermal Resources Council annual meeting, Reno, NV, USA, 24 Sep 1979.

Exposure to noise, H sub 2 S, NH sub 3 , hazardous chemicals and wastes, and heat are the major occupational health hazards associated with geothermal energy development - from drilling to power production. Exposures to these agents, although not unique to geothermal energy development, occur in situations peculiar to the industry. Reports show that occupational illnesses associated with geothermal energy development are increasing, while the corresponding rates from all power production are decreasing. Most of those related to geothermal energy result from the H sub 2 S-abatement systems used in response to environmental pollution regulations. (ERA citation 04:051368)

7. CHEMISTRY

7A. Chemical Engineering

ANL/ES-77 PC **A05**/MF **A01**
Argonne National Lab., IL.
Application of Availability Engineering to Coal Gasification Systems. A Study of a Woodall/Duckham Low-Btu Gasifier System for the Erie Mining Co.
R. D. Doctor, P. Y. Wang, and P. S. Chopra. Jul 79, 98p
Contract W-31-109-ENG-38

The Erie Mining Company, Hoyt Lakes, Minnesota and the Department of Energy have studied construction of a demonstration coal gasification system utilizing Woodall/Duckham technology.

The system would convert approximately 460 tons/day of either eastern or western coal to produce 45 MM SCF of fuel gas with a heating value of 176 Btu (HHV)/SCF as well as a coal tar and oil product that could be used as a back-up fuel. This report applies reliability, maintainability, and availability (RMA) engineering methods to this system. RMA methods make it possible to assess areas of system operation such as criticality of subsystems, unit availability, analysis of the net system availability, cost advantages of various configurations, lost production costs, and capital versus maintenance cost-trade-offs. This study indicates that the annual fuel production goal will be met if the contribution of the tar and oil product heating value is credited together with the fuel gas. This study was conducted for the US Department of Energy in support of the Office of Initial Operations and Materials, Division of Fossil Demonstration Plants. (ERA citation 04:052439)

ANL/OEPM-79-1 PC **A09**/MF **A01**
Versar, Inc., Springfield, VA.
Survey of Potential Chlorine Production Processes. Final Report.
Apr 79, 196p
Contract W-31-109-ENG-38

This report is part of the ongoing study of industrial electrochemical processes for the purpose of identifying methods of improving energy efficiencies. A computerized literature search of past and current chlorine generation methods was performed to identify basic chlorine production processes. Over 200 pertinent references are cited involving 20 separate and distinct chlorine processes. Each basic process is evaluated for its engineering and economic viability and energy efficiency. A flow diagram is provided for each basic process. Four criteria are used to determine the most promising processes: raw material availability, type and amount of energy required, by-product demand/disposal and status of development. The most promising processes are determined to be the membrane process (with and without catalytic electrodes), Kel-Chlor, Mobay (direct electrolysis of hydrogen chloride), the Shell process (catalytic oxidation of hydrogen chloride) and oxidation of ammonium chloride. Each of these processes is further studied to determine what activities may be pursued. (ERA citation 04:055172)

CNEA-443 PC **A02**/MF **A01**
Comision Nacional de Energia Atomica, Buenos Aires (Argentina).
Evaluation of exp 14 C Labelled Solvents for Its Use in the E.R.A. Technique in the Case of Curing of Unsaturated Polyesters.
M. L. Pisarello de Troparevsky, A. E. A. Mitta, and A. Troparevsky. May 78, 12p
In Spanish.
U.S. Sales Only.

The Evaporative Rate Analysis (E.R.A.) technique was evaluated for the study of the curing of unsaturated polyesters as a function of time. Ethylene glycol monoethyl ether acetate exp 14 C was found to be a suitable solvent for this purpose. Determinations take less than 5 minutes, thus avoiding the problems of long test-time which often introduces uncertainly about the real curing time of the sample. (Atomindex citation 10:451473)

CONF-790802-42 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Feasibility Study of Prestressed Concrete Pressure Vessels for Coal Gasifiers.
C. B. Oland, W. L. Greenstreet, and J. P. Callahan. 1979, 12p
Contract W-7405-ENG-26
International conference on structural mechanics in reactor technology, Berlin, F.R. Germany, 13 Aug 1979.

The use of prestressed concrete pressure vessels (PCPVs) for gasifiers in coal conversion systems has been examined. Conceptual designs for commercial-sized vessels were developed based on an output of 2.64 x 10 exp 8 MJ/day for the HYGAS process gasifier and 1.32 x 10 exp 8 MJ/day for the Synthane process gasifier. Circular cylindrical configurations were employed for the single-cavity vessels. Geometry of the liners was essentially the same as proposed for the commercial steel vessel in both cases. Liners for both gasifiers are protected from the process temperature and the deleterious effects of the process media by refractory lining systems. Two liner designs were developed for each type of gasifier based on a hot-liner system and a cold-liner system. The hot-liner is designed to operate at a temperature above the dew point of the process fluid. Insulating concrete is used between the steel liner and the structural concrete. Anchorage is provided by steel anchor studs welded to the liner. The studs extend through the insulating concrete and are embedded into the structural concrete. The refractory is anchored by stainless steel to the inside of the steel liner. Finned tubes through which cooling water is circulated to remove excess heat are located between the insulating concrete and structural concrete. The cold liner, which is restricted to temperatures below the dew point of the process fluid, was selected as the backup design. Each vessel is posttensioned by circumferential strand windings which are confined and anchored in steel-lined precast concrete channels on the outside surface of the PCPV. Linear tendon clusters which are housed in steel ducts provide the axial prestressing. Results of these studies show that the use of prestressed concrete vessels in applications where large, heavy-walled, steel vessels are required is feasible. The advantages of concrete over steel vessels for gasifiers are directly related to vessel size. (ERA citation 04:054026)

CONF-790803-37 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Particle Size Distribution in Coal-Derived Liquids as a Function of Degree of Coal Conversion.
T. M. Gilliam, J. I. Brand, and B. R. Rodgers. 1979, 4p
Contract W-7405-ENG-26
14. intersociety energy conversion conference, Boston, MA, USA, 5 Aug 1979.

Particle size distribution data on slurries of reacted coal-anthracene oil mixtures indicate that the fraction of particles with diameters <10 mu increases steadily to 20% at a conversion of 85%; at higher conversions, it increases very rapidly to 60%. Filtration of the slurries suggests a relationship between overall filtration rate and conversion. (ERA citation 04:052424)

COO-0003-40 PC **A20**/MF **A01**
Lummus Co., Bloomfield, NJ.
Synthane Pilot Plant, South Park Township, Pennsylvania. Run Report No. 2-DB: Operating Period September 1977--September 1978.
1978, 459p
Contract EY-76-C-02-0003

This report covers the operation of the Synthane Coal Gasification Pilot Plant, South Park Township, Allegheny County, Pennsylvania from September 1977 through September 1978. The facility is owned by the United States Government and operated by C-E Lummus. Test Directive No. 2-DB directed the plant be operated with Illinois No. 6 coal from the River King Mine of the Peabody Coal Company at a pressure of 600 psig. Concurrent pretreater/gasifier operation was to take place at coal feed rates from 1.5 to 2.5 tons/hour. Gas was produced for 182 hours and 1,100 tons of coal were fed to the pretreater and gasifier. Continuous operation of up to 56 hours and carbon conversions based on char of up to 72% were achieved. This successful operation demonstrates that coal gasification via the Synthane Process is viable. Additional data are required for the design of a commercial facility; however, the data obtained to date are adequate to recommend improvements and modifications to the Synthane Process Pilot Plant to increase on stream time efficiency. The successful operation of the pilot plant with Illinois No. 6 coal demonstrates the feasibility of the Synthane Pilot Plant to process a caking type of coal. The ability to successfully pretreat a caking coal at high pressure in a plant of this size is a first and a direct result of the successful operation of the Synthane Process. Other similar type processes operated to date require pretreatment of a caking coal at atmospheric pressure with little or no recovery of the gases or heat produced during pretreatment. (ERA citation 04:052441)

COO-0265-3 PC **A04**/MF **A01**
Hydrocarbon Research, Inc., Lawrenceville, NJ.
Coal Cleaning Effects During H-Coal Catalytic Liquefaction of a Western Kentucky Coal.
R. F. Bernard. Dec 78, 75p
Contract EW-78-C-22-0265

Two H-Coal bench-scale liquefaction tests were performed to compare the hydroliquefaction behavior of two Kentucky No. 11 coals from the same mine: a run-of-mine coal with 17.49 W % ash and a deep-cleaned coal with 6.21 W % ash. The tests were conducted using a syncrude mode of operation. The deep-cleaned coal exhibited greater coal conversion and greater residual oil yield than the run-of-mine coal. On a dry coal basis, the deep-cleansed coal yielded approximately 19% more C sub 4 to 975 exp 0 F distillate than the run-of-mine coal. The process requirement of a pumpable vacuum still bottoms product would result in a 10% higher C sub 4 to 975 exp 0 F yield from the deep-cleaned coal than from the run-of-mine coal in a commercial H-Coal plant. (ERA citation 04:052475)

COO-4196-3 PC **A24**/MF **A01**
Carnegie-Mellon Univ., Pittsburgh, PA.
Energy Conservation in Coal Conversion. Final Report, September 15, 1977--September 1, 1978. Selected Case Studies and Conservation Methodologies.
J. C. Purcupile. Sep 78, 566p
Contract EY-77-S-02-4196

The purpose of this study is to apply the methodologies developed in the Energy Conservation in Coal Conversion August, 1977 Progress Report - Contract No. EY77S024196 - to an energy efficient, near-term coal conversion process design, and to develop additional, general techniques for studying energy conservation and utilization in coal conversion processes. The process selected for study was the Ralph M. Parsons Company of Pasadena, California "Oil/Gas Complex, Conceptual Design/Economic Analysis" as described in R and D Report No. 114 - Interim Report No. 4, published March, 1977, ERDA Contract No. E(49-18)-1975. Thirteen papers representing possible alternative methods of energy conservation or waste heat utilization have been entered individually into EDB and ERA. (ERA citation 04:052442)

DOE/EIA-0111/77 PC **A02**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Petroleum Refineries in the United States and Puerto Rico.
1978, 19p

Data are presented on crude oil capacity, storage capacity, and cracking, reforming, coking and alkylation capacity of petroleum refineries in the United States and Puerto Rico as of January 1, 1978. (ERA citation 04:052546)

DOE/ET-0068/1 PC **A04**/MF **A01**
Department of Energy, Washington, DC. Div. of Coal Conversion.
Coal Liquefaction. Quarterly Report, January-March 1978.
Sep 78, 60p
Contract EX-76-C-01-2297

The advantage of coal liquefaction is that the entire range of liquid products, including heavy boiler fuel, distillate fuel oil, gasoline, jet fuel, and diesel oil, can be produced from coal by varying the type of process and operating conditions used in the process. Furthermore, coal-derived liquids have the potential for use as chemical feedstocks. To provide efficient and practical means of utilizing coal resources, DOE is sponsoring the development of several conversion processes currently in the pilot plant stage. Fifteen coal liquefaction projects supported by US DOE are described briefly, with flowsheets, funding, history and progress during the quarter. (ERA citation 04:051002)

DOE/ET-0069/1 PC **A04**/MF **A01**
Department of Energy, Washington, DC. Div. of Coal Conversion.
Coal Demonstration Plants. Quarterly Report, January--March 1978.
Sep 78, 58p
Contract EX-76-C-01-2297

The Department of Energy's demonstration plant program was started in 1974 by one of the Depart-

ment of Energy's predecessor agencies, the Office of Coal Research, US Department of the Interior. The objective of the program is to establish the technical and financial feasibility of coal conversion technologies proven during pilot plant testing. Demonstration plants will minimize the technical and economic risks of commercialization by providing a near commercial size plant for testing and production. Thus, DOE is sponsoring the development of a series of demonstration plants, each of which will be a smaller version of commercial plants envisioned for the 1980's. These plants will be wholly integrated, self-sufficient in terms of heat generation, and dependent only on feedstock of coal, water, and air. Under the DOE program, contracts for designing, constructing, and operating the demonstration plants will be awarded through competitive procedures and will be jointly funded. The conceptual design phase will be funded by the government, with the detailed design, procurement, construction, and operation phases being co-funded, 50% from industry and 50% from the government. The cost involved in building and operating a demonstration plant will probably be between $200 million and $500 million, depending on the size of the plant. Seventeen projects in this program are discussed briefly with identification of the company involved, funding, flow sheets, history and progress during the quarter. (ERA citation 04:050974)

DOE/TIC-10140 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Materials Considerations Relevant to Solar Heating of Chemical Reactions.
V. J. Tennery, and T. N. Tiegs. 1979, 7p
Contract W-7405-ENG-26

Results of a preliminary assessment of the equilibrium thermodynamic stability of a number of ceramic materials for use in solar chemical process heat receivers are given and discussed. The process considered were: (1) hybrid bismuth sulfate cycle for H sub 2 production; (2) cadmium oxide cycle for H sub 2 production; and (3) nitrogen fixation from air for fertilizer production. MgO appears to be the best material for use with the hybrid bismuth sulfate and nitrogen fixation cycles, although the ZrO sub 2 (Y sub 2 O sub 3) ceramic could possibly be used with the hybrid bismuth sulfate cycle. Confirmatory testing of these predictions are planned at ORNL. Since no appropriate thermodynamic data were available for the cadmium cycle, no equilibrium reaction predictions could be made. Testing of candidate materials with components of the cadmium oxide cycle are required and such tests are scheduled for initiation during FY 79. (ERA citation 04:049763)

EPRI-AF-867 PC **A10**/MF **A01**
Southern Co. Services, Inc., Birmingham, AL.
Solvent Refined Coal (SRC) Process Operation of SRC Pilot Plant at Wilsonville, Alabama. Annual Report, January--December 1977.
H. E. Lewis, W. H. Weber, G. B. Usnick, W. R. Hollenack, and H. W. Hooks. Aug 78, 221p

This report presents operating conditions and results for the six-ton-per-day Solvent Refined Coal (SRC) pilot plant at Wilsonville, Alabama, for the months of October, November, and December 1977. It summarizes activities for the 1977 calendar year. Three industrially significant coals were processed: A subbituminous Wyoming coal from Amax Coal Company's Belle Ayr Mine (Wyodak Seam); a high volatile Utah bituminous coal from Consolidation Coal Company's Emery Mine (I and J Seam); and a high volatile Indiana bituminous coal from Old Ben Coal Company's No. 1 Mine (Indiana V Seam). The effects of various process variables on SRC yield and quality were determined. These variables included process solvent boiling range, dissolver volume, accumulated solids concentration, and hydrogen sulfide partial pressure. The effects of operating variables on the overall plant solvent inventory balance are also reported. A distributor plate was installed in the dissolver and its effectiveness for maintaining dissolver solids in a fluidized state is discussed. Several filter aid (precoat) materials were tested. A correlation was developed between the volume of wash solvent used to rinse the filter cake and the amount of ash in SRC. A mathematical model for pressure-leaf filter scaleup was developed from the coal processing data obtained during 1976 and 1977. Centrifugation and antisolvent addition were evaluated as potential alternatives to filtration for mineral residue separation. Major changes to the solvent and product recovery systems are also discussed. (ERA citation 04:025224)

EPRI-AF-916 PC **A12**/MF **A01**
Fluor Engineers and Constructors, Inc., Irvine, CA.
Effects of Sulfur Emission Controls on the Cost of Gasification Combined Cycle Power Systems. Final Report.
S. Feerrar, J. Joiner, J. Kellard, and B. McElmurry. Oct 78, 270p

Economic evaluations were performed for a series of coal gasification-combined cycle power generation facilities, each differing in the mode of operation of the sulfur removal unit. The objectives of the study were to determine the added cost of power associated with more stringent sulfur emission requirements as well as the economic impact of the pressure level at which sulfur removal unit was operated. Similar gasification and power generation facilities were used for each evaluation. Identical Texaco type, oxygen-blown, entrained gasifiers were used for all cases. All were integrated with an advanced combined cycle power generation plant based on a design by Westinghouse. The sulfur removal process in each case was Allied Chemical's proprietary Selexol physical solvent process. The mode of operation of the Selexol Unit was varied to achieve a moderate level of sulfur removal at 350 psig and at 1150 psig. Operation to achieve a very "deep" level of sulfur removal at 350 psig was also evaluated. The ability to currently achieve the emission requirements specified in the deep sulfur removal case was found questionable, and it was concluded that further development work is necessary. Barring development problems, the cost of power at the stricter emissions level was estimated as 7 to 8% higher than at moderate levels. The economic advantage of high pressure sulfur removal operation was concluded to be insignificant in the cases presented. (ERA citation 04:026227)

EPRI-EM-1010 PC **A07**/MF **A01**
Kinetics Technology International Corp., Pasadena, CA.
Assessment of Fuel Processing Systems for Dispersed Fuel Cell Power Plants.
T. Tio, R. Jones, and R. Minet. Mar 79, 130p

Fuel cell power plants currently entering the commercialization stage are limited to the use of light, low sulfur fuels. The objective of this report is to identify a fuel processing system which is capable of processing heavier fuels and can be integrated with the fuel cell in a manner that meets power plant efficiency and cost goals. The report assesses the Toyo Engineering Corporation Total Hydrocarbon Reforming (THR) process and the Societe Chimique de la Grande Paroisse Fluidized Bed process and concludes that neither of these processes, alone, will meet the project efficiency goals. However, a hybrid system is identified, combining the Toyo THR process with an Autothermal Reactor, which shows excellent potential for meeting the desired objectives. This hybrid system is analyzed for a range of operating conditions to obtain an optimum overall efficiency. A conceptual design for the optimized system, integrated with a dispersed phosphoric acid fuel cell generator (5MW), is presented based on use of conventional equipment. Sizing of major equipment, selection of candidate materials of construction, and a capital cost estimate for the overall fuel processor are discussed. Potential problem areas are identified and recommended future development efforts for this highly promising system are proposed. (ERA citation 04:051840)

FE-1207-51 PC **A04**/MF **A01**
Bituminous Coal Research, Inc., Monroeville, PA.
Gas Generator Research and Development: Bi-GAS Process. 84TH Monthly Progress Report, August 1978.
Sep 78, 62p
Contract EX-76-C-01-1207

The life test of catalyst BCR Lot No. 4108, the modified version of No. 4016, was completed. The results obtained showed that the catalyst was extremely active and thermal stability was excellent. A PEDU-size sample of the catalyst has been ordered. The data from PEDU Test No. 31 were evaluated and again confirmed the feasibility of operating the fluidized-bed methanator at low hydrogen to carbon monoxide ratios in the feed for extended periods of time. Results to date for the Homer City methanation catalyst indicate that the bed temperature should be kept as high as possible (at least > 900 exp 0 F) to minimize the possibility of carbon deposition. Analytical and computer services continued in support of the overall program. (ERA citation 04:025183)

FE-1545-TK-14 PC **A05**/MF **A01**
Combustion Engineering, Inc., Windsor, CT.
Test Program for Low-Btu Gasification of Coal for Electric Power Generation. Final Report R and D Task 14 (Phase 1).
J. J. Simon. Nov 77, 100p
Contract EX-76-C-01-1545

A test program was developed to demonstrate the capability and suitability of the process and equipment to produce a low-Btu gas of the predicted composition, heat content and cleanliness from the design coal. This program included both parameter operation and sustained operation periods to provide the design information to enable scale-up of the equipment to commercial-size designs. (ERA citation 04:054030)

FE-1734-45(V.12)(Bk.2) PC **A10**/MF **A01**
Conoco Coal Development Co., Library, PA. Research Div.
CO Sub 2 Acceptor Process Gasification Pilot Plant: Plant Operations Final Report. Final Report, Volume 12: Book 2 of 4, January 1972--October 1977.
1977, 215p
Contract EX-76-C-01-1734

The results of the gasification pilot plant operation are reviewed. A brief tabular history which summarizes the pilot plant objectives, major problems encountered, and the accomplishments of each run is presented. Effort is devoted to the analysis of solids fluidization, solids transport, and system pressure balance. Heat and material balances for selected runs, during which steady-state pilot plant operation was achieved, are presented to aid in appraisal of the process. The pilot plant operating program began in April 1972, and ended with the completion of the last run on October 1, 1977. A total of 75 runs were completed in which over 6,400 hours of operating time were logged while at design process temperature and pressure. Over 6,500 tons of dry lignite and subbituminous coal were gasified. Three North Dakota lignites, one Texas lignite, and three subbituminous coals were successfully gasified. (ERA citation 04:052463)

FE-1734-45(V.12)(Bk.3) PC **A06**/MF **A01**
Conoco Coal Development Co., Library, PA. Research Div.
CO Sub 2 Acceptor Process Gasification Pilot Plant: Plant Operations Final Report. Final Report, Volume 12: Book 3 of 4, January 1972--October 1977.
1977, 119p
Contract EX-76-C-01-1734

This document covers the following sections: development of acceptor reconstitution process, quench tower deposits, methanation system and operating performance, environmental characterization of process, turbine blade erosion tests, and plant innovations and equipment modifications. (ERA citation 04:052464)

FE-1792-50 PC **A03**/MF **A01**
Lockheed Missiles and Space Co., Sunnyvale, CA.
Coal Feeder Development Program. Monthly Progress Report 40.
Oct 78, 27p LMSC/D-630934
Contract EX-76-C-01-1792

The overall program is on schedule, except for completion of the flow simulator which is about 1 week behind schedule. Emphasis has continued on hardware fabrication and procurement. The Model 3 kinetic extruder was received and the horizontal shaft housing and drive system will be available by 1 December 1978. Initial tests with the con-

trollable sprue rotor confirmed that the new rectangular shaped sprue entrance configuration eliminates sprue plugging during shut down. (ERA citation 04:025188)

FE-2012-036 PC **A04**/MF **A01**
Illinois Coal Gasification Group, Chicago.
Pipeline Gas Demonstration Plant, Phase I. Quarterly Technical Progress Report, June--August 1978.
R. J. Eby. Sep 78, 56p
Contract EF-77-C-01-2012

Work has continued in the following Tasks of the Pipeline Gas Demonstration Plant Program: Process design studies, trade-off studies and selection of processs were completed and the following Task I Deliverables were submitted to the Department of Energy (DOE); Process Evaluation Report and Revised Conceptual Commercial Plant Baseline. The Conceptual Commercial Plant Design Report, which completes Task I, will be submitted to DOE on September 30, 1978. A Local Resources Survey Report has been submitted to DOE. In accordance with Contract Modification A011, work on Environmental Baseline Monitoring Activities has continued. All other work activity under the contract is still officially suspended in accordance with the Supsension of Work, Article (4) XXXII. (ERA citation 04:052451)

FE-2012-051 PC **A03**/MF **A01**
Illinois Coal Gasification Group, Chicago.
Pipeline Gas Demonstration Plant, Phase I. Quarterly Technical Progress Report, September--November 1978.
R. J. Eby. Dec 78, 47p
Contract FE-77-C-01-2012

Work has continued on the Pipeline Gas Demonstrtion Plant Program. The following Major Contract Deliverables have been submitted to DOE: Conceptual Commercial Plant Design Report; Climatological and Meteorological Report; Preliminary Foundation Investigation and Solid Analysis Report; Site Survey Report, Site Transportation Study Report, Site Water Resources Report, and the Site Environmental Survey Report. With the submittal of the Conceptual Commercial Plant Design Report to DOE on September 28, 1978, ICGG has completed the Task I Work Effort. Other work has progressed at a reduced level of effort in accordance with Contract Modification A011 and as a result of the limitation of available funds. All other work activity under the contract is still officially suspended in accordance with the Suspension of Work, Article (4) XXXII. (ERA citation 04:052452)

FE-2012-058 PC **A03**/MF **A01**
Illinois Coal Gasification Group, Chicago.
Pipeline Gas Demonstration Plant. Phase I. Quarterly Technical Progress Report, December 1978--February 1979.
R. J. Eby. Mar 79, 46p
Contract EF-77-C-01-2012

Overall work activity and progress have been curtailed by the limitation of available funds, problems related to process licensor subcontractng and the awaiting of a decision by DOE to continue the ICGG Pipeline Gas Demonstration Plant Program. The lack of adequate funding has caused a slowdown of selected work activities and the postponement of other efforts. The allotment of sufficient funds by DOE will eliminate this problem and permit the implementation of an effective work plan for the completion of Phase I of this Program. Work related to the definitive process design in Task II has been critically hampered and delayed by not obtaining process licensor data due to lack of DOE approval of these subcontracts. The resolution of this situation is vital to the completion of this task and subsequent tasks in this phase. ICGG has been working at less than an optimum rate pending a decision by DOE as to the continuation of Phase I. On January 23, 1979, DOE authorized ICGG to continue detailed design of the Demonstration Plant and to proceed with the completion of Phase I of the Program. With the decision for ICGG to proceed and predicated on the resolution of the subcontracting problems in conjunction with adequate funding by DOE, the project should progress in an orderly and effective manner. (ERA citation 04:048044)

FE-2044-41 PC **A02**/MF **A01**
Rockwell International Corp., Canoga Park, CA. Energy Systems Group.
Partial Liquefaction of Coal by Direct Hydrogenation. Quarterly Progress Report, October--December 1978.
A. Y. Falk. 1978, 12p
Contract EX-76-C-01-2044

Construction of the high pressure product recovery system was completed and activation/checkout of this system initiated. Design of a heat recovery quench unit was completed. Facility activation is proceeding well. A preliminary test matrix for the initial Process Development Unit testing is presented. The primary objectives of this testing are to obtain better product recovery, improved process characterization, and longer test durations. The tests will be conducted employing Kentucky No. 9 bituminous coal at reactor temperatures and residence times known to produce high liquid product yields. (ERA citation 04:052478)

FE-2270-39 PC **A08**/MF **A01**
Catalytic, Inc., Wilsonville, AL.
Solvent Refined Coal (SRC) Process Operation Solvent Refined Coal Pilot Plant. Quarterly Technical Progress Report, July--September 1978.
H. E. Lewis, W. H. Weber, G. B. Usnick, W. R. Hollenack, and H. O. Blair. Mar 79, 168p
Contract EX-76-C-01-2270

Operating conditions and test results obtained at the Solvent Refined Coal (SRC) pilot plant in Wilsonville, Alabama during the third quarter of 1978 are summarized. Indiana V coal processing was concluded. The feedstock was changed in September to Kentucky 6 and 11 from Pyro Mining Company's Pyro Mine. A run was completed on Indiana V coal wherein the inventory of dissolver solids was controlled by use of a bottom withdrawal system. The solids concentration was varied from 5 to 37 lb/ft exp 3 to study its effects on SRC yield. Operation of the Kerr-McGee Critical Solvent Deashing (CSD) unit was continued. SRC containing 0.06 to 0.75% ash was produced at feed rates as high as 300 lb/hr. SRC recovery ranged from 73 to 84%. (ERA citation 04:052479)

FE-2275-9 PC **A04**/MF **A01**
Purdue Univ., Lafayette, IN.
Systems Studies of Coal Coal Conversion Processes Using a Reference Simulator. Quarterly Report, July 1, 1978--September 30, 1978.
G. V. Reklaitis, M. K. Sood, Y. Soni, B. W. Overturf, and P. Buchanan. Nov 78, 62p
Contract EX-76-C-01-2275

The plant capital cost estimation package has been largely implemented. Testing and documentation is projected to be completed by the end of the next quarter. Additions consisting of the physical properties package of entropy estimation capabilities and of automatic selection of the steam table routines when appropriate were made. Significant progress has been made in developing equipment modules for the pyrolysis vapor recovery, heat recovery, bulk methanation, and H sub 2 plant sections. These modules include an ejector model, an electrostatic precipitator model, an alternate three phase column routine, a multiphase heat exchanger design routine, as well as a steam reformer furnace design program. Case studies have been carried out on the heat recovery section. Integrated simulations of the methanation, vapor recovery, and H sub 2 plant sections are in various stages of assembly. The hierarchical calculation strategy which is to allow execution of over-all flowsheet simulations in terms of a linked sequence of process section simulations has been demonstrated successfully. An available ethylene oxide/glycol process simulation model was used as a test case. Execution time reductions to 1/3 of the direct simulation time could be shown. Work is in progress in generalizing the interfacing and applying the strategy to portions of the modified COED flowsheet. Successful linkage of the combined pryolysis, gasifier, lift-tube, and combustor models was achieved. These models include detailed kinetics, heat transfer calculations as well as particle balance calculations which allow both particle shrinkage at constant density and reduction of particle density at constant size. Several case studies were run and more are projected. (ERA citation 04:052453)

FE-2434-33 PC **A05**/MF **A01**
Institute of Gas Technology, Chicago, IL.
Pipeline Gas from Coal--Hydrogenation (IGT Hydrogasification Process). Project 9000 Quarterly Report No. 8 for the Period April 1--June 30, 1978.
Mar 79, 98p
Contract EX-76-C-01-2434

Illinois bituminous coal was used to acquire data for optimizing the HYGAS Process. Three major modifications were made in the pilot plant to encourage optimum operating conditions and clinker-free operation. Their effectiveness was assessed by Test 71, which successfully showed that all three modifications effectively left the steam-oxygen zone entirely clinker-free after the test. A post-run inspection and the necessary turnaround activities were completed after Test 71. Test 72 was conducted as a continued exploration of the conditions for optimizing reactor operation by improving carbon conversion to the 85% to 90% level, increasing the temperature in the steam-oxygen gasifier to 1800 exp 0 F, and continuing to reduce the steam-to-char ratios to approximately those used in the commercially designed (by Procon, Inc.) HYGAS Process unit. During Test 72, a total of 392 tons of pretreated char was fed to the reactor. Char conversions, determined by quick ash analyses, ranged from 60% to 90% at an operating temperature of 1800 exp 0 F. The steam feed rate was set at 5000 lb/hr, and the char feed rate was 2 tons/hr. The test was terminated at the end of the month when the vibrating feeder from the pretreated-char storage hopper failed and forced the suspension of char feed to the reactor. Several steady-state periods were selected for detailed study. A post-run inspection of the plant was made to determine the areas where modifications might be made to further increase the operating efficiency of the pilot plant. As a result, the bucket elevator speed was increased to improve its capacity, and the coal-mill crushing speed was lessened to reduce fines generation. (ERA citation 04:050980)

FE-2469-35 PC **A05**/MF **A01**
Institute of Gas Technology, Chicago, IL.
Experimental Program for the Development of Peat Gasification. Interim Report No. 6: Hydrogasification and Fluidized-Bed Tests as of September 30, 1978.
Mar 79, 100p
Contract EX-76-C-01-2469

The results of tests with the Minnesota peat and laboratory-scale tests with North Carolina and Maine peats are presented. Thirty-five tests were conducted in the hydrogasification PDU with Minnesota reed sedge peat to determine the effects of temperature, hydrogen partial pressure, residence time, and the presence of carbon oxides (in synthesis gas) on the product distribution and yields. The tests were conducted at coil temperatures of 800 exp 0 to 1550 exp 0 F, hydrogen partial pressures of 0 to 535 psia, and residence times of 3 to 22 seconds. The peat flow rates were as high as 250 times those in the laboratory-scale tests. The results agree reasonably well with the laboratory-scale data. Eighteen gasification tests were conducted in a 6-inch-diameter fluidized-bed reactor with steam and oxygen. Both Minnesota peat char and raw peat were gasified. The objectives were to determine the effects of temperature, pressure, and steam/feed carbon mole ratio on the gasification characteristics of peat and peat char. The tests were conducted at pressures of 350 to 535 psia, average bed temperatures of 1700 exp 0 to 1900 exp 0 F, steam/feed carbon mole ratios of 0.7 to 3.9, and fluidization velocities of 0.4 to 1.0 ft/s. Carbon conversions as high as 98% were achieved. The effects of temperature and fluidization velocity on the sintering characteristics of peat were also determined. Twenty-three tests were conducted in the thermobalance with chars of peats from North Carolina and Maine at various pressures and temperatures and with steam/hydrogen mixtures and synthesis gas to determine gasification characteristics of these peats and to develop kinetic models similar to those developed for Minnesota peat.The gasification characteristics of these peats are quite similar to those of Minnesota peat. (ERA citation 04:054031)

FE-2514-M1 PC **A04**/MF **A01**
Lummus Co., Bloomfield, NJ.

Developmental Research Program for Clean Industrial and Transportation Fuels from Coal.
G. J. Snell. Mar 78, 60p
Contract EF-76-C-01-2514

A coal liquefaction pilot plant facility originally designed for blocked continuous operations was modified for fully integrated continuous operation. This facility, after leak testing and mechanical debugging, was operated in a continuous and fully integrated manner with a coal paste feed consisting of 30 wt. % Illinois No. 6 coal. The presulfided 1/32" extrudate nickel molybdate catalyst initially charged to the upflow expanded bed hydroliquefaction reactors was replaced with a 10-14 mesh presulfided spherical nickel molybdate catalyst following initial operations. Coal space rate limitations at recycle/fresh-feed ratios in the neighborhood of 0.8 - 1.4 with different catalyst shapes and sizes were determined. A severe pressure letdown valve erosion problem was observed during initial pilot plant operations. Cobalt molybdate catalyst, nickel molybdate catalyst and a developmental proprietary catalyst were evaluated in a separate continuous bench-scale unit. All catalysts were 1/32" extrudates and a coal paste feedstock was used exclusively. Denitrogenation activity of the nickel molybdate and proprietary catalysts were found to be 15% and 18%, respectively, higher than the cobalt molybdate catalyst (Cyanamid 1442B). Since the nickel molybdate catalyst was of a commercially available type, the decision was made to utilize this catalyst for the immediate effort while investigations were pursued outside of the contract work to effect further improvements on the performance of the proprietary catalyst. (ERA citation 04:054046)

FE-2566-20 PC **A04**/MF **A01**
UOP, Inc., Des Plaines, IL. Corporate Research Center.
Upgrading of Coal Liquids. Interim Report: Hydrotreating and Fluid Catalytic Cracking of H-Coal Process Derived Gas Oils.
G. Tan, and A. J. DeRosset. Aug 78, 65p
Contract EF-77-C-01-2566

The applicability of commercial UOP hydrotreating and fluid catalytic cracking (FCC) processes to distillate liquids derived from the H-Coal process was evaluated. The raw H-Coal atmospheric still bottoms were rerun in a laboratory column to remove heavy ends generated during storage. This operation also substantially reduced the contents of heptane insolubles, Conradson carbon, and steam jet gum. The rerun H-Coal atmospheric still bottoms (H-coal gas oil) were used to evaluate the relative hydrogenation activity of three UOP commercial catalysts. The UOP-DCB catalyst, which was found to have the highest hydrogenation activity, was employed in the H-Coal gas oil hydrotreating process variable studies. Fluid catalytic cracking of H-Coal derived distillate liquids was carried out over a commercial zeolite catalyst. Two sets of processing conditions were employed to catalytically crack each of these feedstocks. Results show that feed hydrogen content is a dominant factor on conversion and yield structure. Hydrotreating substantially improved the cracking characteristics of the H-Coal gas oil. As more hydrogen was added, the feed showed higher conversion and increased gasoline yield with reduced carbon deposition. In the range of conditions investigated, high octane gasolines were obtained. Cycle oils containing 650 exp 0 F exp - distillate as high as 93 vol-% were generated. The lighter portions of the cycle oil, boiling between 400-650 exp 0 F, are valuable components of distillate fuels and heating oils. It is concluded that with an appropriate degree of hydrotreatment the H-Coal process derived gas oil, or any other coal derived distillate of similar quality, can be readily processed into high quality gasolines by applying advanced commercial fluid catalytic crackingtechnology. The FCC cracker, in conjunction with a hydrotreater, shows potential in playing a major role in the commercial refining of coal derived liquids. (ERA citation 04:054047)

FE-2566-23 PC **A07**/MF **A01**
UOP, Inc., Des Plaines, IL. Corporate Research Center.
Upgrading of Coal Liquids. Interim Report: Hydrocracking of H-Coal Process Derived Gas Oils.
G. Tan, and A. J. DeRosset. Nov 78, 145p
Contract EF-77-C-01-2566

The objective of this work was to evaluate, by bench scale continuous tests, the applicability of commercial UOP hydrocracking processes to conversion of H-Coal atmospheric still bottoms. Commercial catalysts were used. Process conditions were within commercial ranges. Relative to conditions specified in a base case for hydrocracking Arabian gas oil, the pressures used ranged from 500 psig lower to 500 psig higher. Temperatures were generally within 20 exp 0 C of base. Space velocities varied from one quarter of base up to base value. Catalysts, process conditions, and reactor sequences were varied to produce either gasoline, or environmentally acceptable No. 2 fuel oil. The H-Coal atmospheric bottoms were hydrotreated in one stage to give a low nitrogen, low sulfur fuel oil at 80% yield. Complete conversion to 600 exp 0 F exp - distillate was achieved by processing the heavy ends in a second hydrocracking stage. Conversion of the H-Coal atmospheric bottoms to gasoline was carried out in two stages. The second stage comprised either a single hydrocracking reactor or two reactors in series flow. The latter arrangement yielded, under the process conditions employed, 98 volume percent of 93 octane C sub 5+ gasoline, plus 28 volume percent of butanes. Hydrogen consumption was high, close to 4000 SCF/B for gasoline production and 1600 SCF/B for fuel oil production. This is a consequence of the aromaticity (85 volume percent) of the H-Coal atmospheric bottoms, as well as the high level of heterocyclic structures containing nitrogen, sulfur, and oxygen, which must be removed. In the gasoline case, about a half of this hydrogen can be recovered by steam reforming the light gases (C sub 1 -C sub 3) produced, and reformingthe hydrocracked gasoline. Including butanes in the steam reformer feed should result in hydrogen balance. (ERA citation 04:054048)

FE-2645-02 PC **A02**/MF **A01**
UOP, Inc., Des Plaines, IL. Corporate Research Center.
Deasphalting, Deashing, and Upgrading of Coal Liquids. Quarterly Technical Progress Report, January--March 1979.
F. J. Riedl, and A. J. deRosset. May 79, 14p
Contract EF-77-C-01-2566

Feedstock for Demex deashing of coal liquids was prepared by liquefying a slurry of Illinois No. 6 coal in a coal-derived solvent. Of the moisture free slurry fed, 95% was obtained as feed to the Demex unit. The remainder was C sub 6 - light ends. Coal conversion on a MAF basis was 92.5%. The Demex operation has been completed after overcoming problems with the bottoms product transfer system. The results are currently being evaluated and product analyses are in progress. The hydrotreating of the Demex product is to be started in early May. (ERA citation 04:050935)

FE-2778-8 PC **A04**/MF **A01**
Pullman Kellogg, Houston, TX.
Engineering Support Services for the DOE/GRI Coal Gasification Research Program. Quarterly Technical Progress Report, January--March 1979.
A. E. Cover, L. E. Bostwick, J. M. Gunderson, B. P. Castiglioni, and D. A. Hubbard. Apr 79, 75p
Contract ET-78-C-01-2778

The objective of this contract is to provide engineering support services to the Department of Energy/Gas Research Institute in the high Btu coal gasification research program. The gasification research program is to determine the specific process and/or combination of component processing steps that offer the greatest economic potential for commercial application. Kellogg's activities during the second quarter of this contract consisted of continued monitoring at the Hygas and Bi-GAS pilot plant sites. Hygas debriefing meetings followng Tests 77 and 78 were attended in Chicago. Trip reports were issued on Hygas Tests 75, 76, and 77, BI-GAS tests G-6E, G-6F, and G-7, and Westinghouse run TP-019-3. (ERA citation 04:052454)

FE-3023-4 PC **A02**/MF **A01**
Battelle Columbus Labs., OH.
Inactivation/Property Management of the Agglomerating Burner PDU. Third Quarterly Technical Progress Report, 1 February--30 April 1979.
R. D. Litt. May 79, 4p
Contract ET-78-C-01-3023

The PDU has been maintained in accordance with the detailed Maintenance Procedures. This maintenance includes all of the equipment of the PDU plus the property management and security of the facility. (ERA citation 04:050986)

FE-3125-2 PC **A04**/MF **A01**
Rockwell International, Canoga Park, CA. Environmental and Energy Systems Div.
Advanced Development of a Short-Residence-Time Hydrogasifier. First Quarterly Technical Progress Report, September 30, 1978--December 31, 1978.
J. Friedman. Jan 79, 75p
Contract ET-78-C-01-3125

Design for facility modifications was initiated and completed. The facility will be moved from its former Rocketdyne test site to the ESG Energy Bowl Control Center. Subcontract effort for site preparation was initiated in October and is currently ongoing. Disassembly and relocation was started at the conclusion of the low hydrogen/coal ratio injector concept testing. Reassembly, plus the modifications to support the longer duration testing, is scheduled to be completed approximately on March 1, 1979. Specifications were prepared for the fabrication of a new high pressure coal feeder and fpr the modification of the existing low pressure batch feeder. Specifically, two new types of 1/4-TPH injectors were designed to meet the following requirements: (1) optimum mixing of the hydrogen and coal jets at a H sub 2 /coal weight ratio of 0.25, (2) option to feed supplementary oxygen, either into the preburner or into the reactor chamber through the face of the injector, and (3) structural and operational stability during the projeced 1-hr operation per test run. Six reactor tubes, three having 15-ft lengths and the other three having 7.5-ft lengths, were designed to mate with the new injectors. Other components in the process of design are (1) and additional 4 ft long water-spray quench section to provide longer residence time for water droplet evaporation, and (2) and 11.5 ft long heat-recovery quench section having a shell-and-tube straight-through design with hydrogen as the cooling fluid. (ERA citation 04:049440)

GEPP-TIS-446 PC **A03**/MF **A01**
General Electric Co., St. Petersburg, FL. Neutron Devices Dept.
Calcium Chromate Process Related Investigations.
B. M. Dillard. 29 Aug 79, 39p
Contract EY-76-C-04-0656

A pilot plant for production of calcium chromate has been scaled up to a small production facility at the General Electric Neutron Devices Department. In preparation for this scale-up, the process and final product were studied in order to evaluate problems not considered previously. The variables and processes studied included: (1) the determination of optimum drying temperature and time for product analysis; (2) the effect of the grade of lime used as the precipitating agent on the purity of the calcium chromate; (3) product purity when calcium chromate is precipitated by the addition of ammonium chromate to slaked lime; (4) the reagents best suited for cleaning calcium chromate spills; and (5) methods for determining hydroxide ion concentration in calcium chromate. The optimum drying time for the product before analysis is four hours at 600 exp 0 C. Gases evolved at various temperatures during the drying process were carbon dioxide and water vapor. Technical grade lime produced calcium chromate of the highest purity. Both nitric and acetic acids were efficient dissolvers of calcium chromate spills. Direct titration of hydroxide ion with sulfuric acid gave an average recovery of 93% for samples spiked with calcium hydroxide. 1 figure, 17 tables. (ERA citation 04:053490)

JPL-TSR-79/6 PC **A03**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Coal Pump Development and Technical Support Project. Quarterly Technical Status Report, 28 May-1 July 1979.
1979, 32p

Contract EF-77-A-01-2616

Progress on the assessment of advanced coal gasification processes (Avco-Everett, Bell Aerospace Textron, Rockwell International and Exxon Research and Engineering Co.) is noted. Tests and performance evaluation of several fuel feeding systems are reported. Efforts on the coal pump development have been completed with the successful test of flow control components. Spray test data is being collected. (ERA citation 04:052456)

ORNL/SUB-7186/16 PC **A03**/MF **A01**
Parsons (Ralph M.) Co., Pasadena, CA.
Coalcon Process Review. R And D Interim Report No. 3.
Jun 78, 34p
Contract W-7405-ENG-26

This report reviews the economics and design of the Coalcon process. Two areas, solids removal and sulfur removal, were examined in detail. The results indicate that sulfur removal would add $1.65 to $4.40 per barrel to the cost of the fuel oil. Solids removal could add $2.35 to $4.00 per barrel to the cost of the fuel oil. (ERA citation 04:025241)

PB80-802267 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Textile Processing Wastes and Their Control (Citations from the NTIS Data Base).
Rept. for 1964-Nov 79,
Diane M. Cavagnaro. Dec 79, 179p
Supersedes NTIS/PS-78/1265, NTIS/PS-77/1082, NTIS/PS-76/0962, NTIS/PS-75/729, and NTIS/PS-75/080. For the companion Published Search of the Engineering Index Data Base, see PB80-802275.

The bibliography contains selected abstracts of research reports covering textile processing, air pollution control, water pollution control, and solid waste disposal. Included are waste water treatment studies on dyes, biological industrial waste treatment, use of membranes, cost estimates of the control technology, and design criteria of control equipment. (This updated bibliography contains 173 abstracts, 32 of which are new entries to the previous edition.)

PB80-802275 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Textile Processing Wastes and Their Control (Citations from the Engineering Index Data Base).
Rept. for 1970-Nov 79,
Diane M. Cavagnaro. Dec 79, 124p
Supersedes NTIS/PS-78/1266, NTIS/PS-77/1083 and NTIS/PS-76/0963. For the companion Published Search of the NTIS Data Base, see PB80-802267.

These citations of worldwide research cover the textile industry as it deals with water pollution, air pollution, and solid wastes and their control. The bibliography includes studies of wastewater treatment of dyes, the use of activated carbon in the processes, design criteria of the control equipment, and reusing materials that are recovered in the control process. (This updated bibliography contains 218 abstracts, 26 of which are new entries to the previous edition.)

7C. Organic Chemistry

AD-A076 123/9 PC **A03**/MF **A01**
State Univ of New York At Buffalo Dept of Chemistry
Preparation and Properties of ((Trimethylsilyl)-methyl)-gallium(III) Compounds.
Technical rept.,
O. T. Beachley, Jr. , and R. G. Simmons. 1 Nov 79, 29p Rept no. TR-3
Contract N00014-78-C-0562

A series of neutral organogallium(III) compounds which incorporate the (trimethylsilyl)methyl ligand, Ga(CH2SiMe3)n X3-n (n = 3,2,1; X = (Cl, Br) have been prepared and fully characterized by elemental analyses NMR and infrared spectroscopy, molecular weight data, solubility properties and Lewis acid-base chemistry. The parent compound Ga(CH2SiMe3)3 was prepared from GaCl3 by a standard Grignard reaction in diethylether. The halogen derivatives were prepared from Ga(CH2SiMe3)3 by elimination reactions with HCl or HBr and exchange reactions with GaCl3 or GaBr3.

JEN-431 PC **A02**/MF **A01**
Junta de Energia Nuclear, Madrid (Spain).
Analytical Control of the Synthesis of the Trithion and Its Precursors by Gas Chromatography.
P. Gonzalez Moreno, M. Perez Garcia, and M. Angoso. 1979, 10p
In Spanish.
U.S. Sales Only.

The synthesis of pesticide trithion and its percursors has been controlled by G.L.C. selecting the best separation conditions and responses. The following columns have been used: 20% FFAP on chromosorb W (a,w.) D.M.C.S. for organophosphate precursor; glass column of 5% Silicone SE-30 on chromosorb G (a.w.) D.M.C.S. for S-(p-chlorophenyl-chloromethyl) and 12% silicone SE-30 modified with 8% of neopentil-glicolsuccinate for trithion. The relative retention times, retention indices and relative responses for trithion and its precursors have been calculated. (Atomindex citation 10:451565)

PAT-APPL-6-058 177 PC **A03**/MF **A01**
Department of Health, Education, and Welfare, Washington, DC.
Carbocyclic Analogs of Cytosine Nucleosides.
Patent Application,
Y. Fulmer Shealy, and C. Allen O'Dell. Filed 17 Jul 79, 39p PB80-114846
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Novel compounds are disclosed which are (carbocyclic analogs of cytosine nucleosides) in which the pentose moiety of the nucleoside is replaced by a cyclopentane ring. The novel compounds exhibit antiviral activity, and certain of them also exhibit antineoplastic activity against the L 1210 mouse leukemia test system.

PATENT-4 166 160 Not available NTIS
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Mixed Diamines for Lower Melting Addition Polyimide Preparation and Utilization.
Patent,
T. L. St. Claire. Filed 6 Oct 77, patented 28 Aug 79, 5p N79-33316/7, PAT-APPL-839 963
Supersedes PAT-APPL-839 963-77, N78-18218 (16 - 08 p 1002).
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

A novel addition polyimide based on the use of liquid monomers is described. The essentially solventless prepreg produced retails good drape, tack, and other mechanical properties.

7D. Physical Chemistry

AD-A075 644/5 Not available NTIS
Toronto Univ (Ontario) Dept of Chemistry
Steric Acceleration of Perester Decomposition Leading to Tertiary Alkyl Radicals,
John A. Ernst, Chacko Thankachan, and Thomas T. Tidwell. 7 Oct 74, 2p
Availability: Pub. in Jnl. of Organic Chemistry, v39 n24 p3614-3615 1974 (No copies furnished by DTIC).

No abstract available.

AD-A075 750/0 Not available NTIS
National Research Council of Canada Ottawa (Ontario)
Exact Solution of a Vibronic Coupling Model and Its Implications for the Herzberg-Teller Expansion Method,
Allan R. Gregory , and Willem Siebrand. 11 Feb 75, 4p Rept no. NRC-14642
Availability: Pub. in Chemical Physics Letters, v33 n3 p447-450, 15 Jun 75 (No copies furnished by DTIC).

No abstract available.

AD-A075 762/5 PC **A03**/MF **A01**
Illinois Univ At Urbana-Champaign
Reaction of Calcium Silicates with Carbon Dioxide and Water.
Final rept. Jan 76-Jan 79,
R. L. Berger , and J. Francis Young. 26 Sep 79, 39p ARO-13031.3-MS
Grants DAAG29-76-G-0116, DAAG29-78-G-0049

The reaction of five calcium silicates with CO2 water were investigated. The calcium silicates differed in Ca/Si ratio or polymorphic type. Reaction kinetics were dependent on the Ca/Si ratio of the initial calcium silicates. Activation energy for the carbonation reaction ranged from 9.8 kcal/mole for Ca3SiO5 to 22.9 kcal/mole for CaSiO3. The reaction products were calcium carbonate (CaCO3) and a calcium silicate hydrate of variable stoichiometry. The Ca and H2O content of the calcium silicate hydrate product decreases with degree of reaction. This results in the final stable reaction products consisting of calcium carbonate and a highly polymerized hydrous silica gel which is insoluble in HCl. Calcite forms during the carbonation of Ca3SiO5, beta-Ca2SiO4, and gamma-Ca2SiO4 if free water is present. Aragonite forms in the absence of free H2O and in the carbonation of CaSiO3. The carbonation reaction decreases rapidly at CO2 pressures <0.12. At pressures from 0.12 to 54 atm the carbonation reaction increases, but at a slow rate. Temperature and relative humidity have significant influences on the rate of carbonation. (Author)

AD-A075 767/4 Not available NTIS
Laval Univ (Quebec) Dept of Chemistry
Low-Pressure Non-Equilibrium Activation Energy of Unimolecular Reactions,
R. C. Bhattacharjee , and W. Forst. 1 Mar 74, 5p
Availability: Pub. in Chemical Physics Letters, v26 n3 p395-399, 1 Jun 74 (No copies furnished by DTIC).

No abstract available.

AD-A075 773/2 Not available NTIS
Royal Military Coll of Canada Kingston (Ontario) Dept of Chemistry and Chemical Engineering
Surface Studies of Carbon: Acidic Oxides on Spheron 6,
S. S. Barton , D. Gillespie , and B. H. Harrison. 7 May 73, 7p
Availability: Pub. in Carbon, v11 p649-654 1973 (No copies furnished by DTIC.)

No abstract available.

AD-A075 782/3 PC **A02**/MF **A01**
Sussex Univ Brighton (England) School of Engineering and Applied Sciences
Direct Measurement by Secondary-Ion Mass Spectrometry of Self-Diffusion of Boron in Fe40Ni40B20 Glass.
Technical rept.,
R. W. Cahn, J. E. Evetts, J. Patterson, R. E. Samekh, and C. Kenway Jackson. 1 Oct 79, 20p Rept no. TR-2
Contract N00014-78-G-0048

The available methods for measuring diffusion rates of various metalloids in metallic glasses are critically reviewed, and the advantages of studying boron diffusion by secondary-ion mass-spectrometry (SIMS) set out. A surface coating of chemical composition similar to that of the glass but enriched in 10(B) was deposited on the polished glass by sputtering in an ultraclean environment. The samples were diffusion-annealed and profiled by SIMS. Subsequent tests showed that some samples had partly crystallized and these had anomalously low diffusion rates.

AD-A075 792/2 Not available NTIS
Calgary Univ (Alberta) Dept of Chemistry
Vibrational Analysis of Diethyl Ketone and Its Deuterated Analogues,
Z. Buric , and P. J. Krueger. 6 Nov 70, 23p
Availability: Pub. in Spectrochimica Acta, v30A p2069-2090 1974 (No copies furnished by DTIC).

No abstract available.

AD-A075 798/9 Not available NTIS
National Research Council of Canada Ottawa (Ontario)
Diamagnetic Properties of the Electron-Exciton Bound States in Charge-Transfer Organic Solids,
C. Mavroyannis. 7 Jan 75, 13p Rept no. NRC-14528
Availability: Pub. in Jnl. of Low Temperature Physics, v20 n3/4 p301-312 1975 (No copies furnished by DTIC).

No abstract available.

AD-A075 799/7 Not available NTIS
National Research Council of Canada Ottawa (Ontario)
Superconductivity-Type Fluctuations in the Electronic Spectra of Charge-Transfer Organic Solids,
C. Mavroyannis. 7 Jan 75, 16p Rept no. NRC-14529
Availability: Pub. in Jnl. of Low Temperature Physics, v20 n3/4 p285-299 1975 (No copies furnished by DTIC).

No abstract available.

AD-A075 804/5 PC **A04**/MF **A01**
North Carolina Univ At Chapel Hill Dept of Chemistry
Magnetism of Mixed Valence Compounds.
Technical rept.,
William E. Hatfield. 1 Oct 79, 54p Rept no. TR-8
Contract N00014-76-C-0816

Results of representative studies of magnetic properties of mixed valence compounds are described in terms of Heisenberg-Van Vleck-Direc exchange theory, which is developed. Systems of discrete clusters, chains, sheets, and three dimensinal polymeric materials are discussed. Several important problems requiring additional research are identified. (Author)

AD-A075 830/0 PC **A03**/MF **A01**
New York Univ N Y Dept of Physics
Theory of Saturation Spectroscopy Including Collisional Effects,
P. R. Berman , P. F. Liao , and J. E. Bjorkholm.
Sep 79, 29p
Contract N00014-77-C-0553

A theory of saturation spectroscopy in three-level gas vapor systems, including collisional effects, is presented. Using a model of collisions in which they are phase-interrupting in their effect on level coherences and velocity-changing in their effect on level population densities, we calculate the absorption profile of a weak probe field on a given transition when an arbitrarily strong pump field acts on a coupled transition. Line shapes are derived for an arbitrary collision kernel describing the velocity-changing collisions, and these line shapes are evaluated for the collision kernel proposed by Keilson and Storer. Various limiting forms for the line shapes are derived and representative line shapes are displayed. Several new features of the line shapes, including collisionally-induced increased probe absorption are discussed. The line shapes are seen to reflect the various collisional processes that may occur in atomic or molecular systems. (Author)

AD-A075 831/8 PC **A02**/MF **A01**
New York Univ N Y Dept of Physics
Pulse Area Effects in Resonant Multiphoton Ionization,
E. J. Robinson. Sep 79, 8p
Contract N00014-77-C-0553

A theory of resonant multiphoton ionization by smooth pulses is developed. It is shown that the spectrum of the effect may exhibit structure associated with time domain correlations. (Author)

AD-A075 834/2 PC **A02**/MF **A01**
Oklahoma Univ Norman Dept of Chemistry
The X-Ray Crystal Structure of Trimethyltin (IV) Azide. A Unique One-Dimensional (CH3)3Sn) Delta + (CH3)3Sn(N3)2) Delta-)n Polymer.
Technical rept.,
Desmond Cunningham , M. B. Hossain , K. C. Molloy , D. van der Helm , and J. J. Zuckerman.
24 Sep 79, 12p Rept no. TR-12
Contract N00014-77-C-0432

Our 1978 review of the tin structural literature reveals many examples of axially-most electronegative, trigonal bipyramidal triorganotin moieties in associated polymer chains, but the structure of trimethyltin azide is unique in consisting of SnC3 moieties in alternating (CH3) 3 Sn(delta +) cationic and N3(CH3)3SnN3 (delta -) aniotic environments in a one-dimensional array with the tin atoms bridged at unequal distances by the alpha-nitrogen atoms of the azide group at which site the chains are bent. (Author)

AD-A075 844/1 Not available NTIS
Defence Research Establishment Valcartier (Quebec)
Near Single-Line Operation of a Free-Burning CS2/O2/N2O Flame Laser with a Nondispersive Optical Cavity,
Kenneth D. Foster , George H. Kimbell , and David R. Snelling. 26 Sep 74, 6p
Availability: Pub. in IEEE Jnl. of Quantum Electronics, vQE-11 n6 p253-258 Jun 75 (No copies furnished by DTIC).

No abstract available.

AD-A075 846/6 PC **A02**/MF **A01**
Princeton Univ N J Dept of Chemistry
Photoionization Thresholds of Divalent Rare Earth Ions in Alkaline Earth Fluorides.
Technical rept.,
Christian Pedrini , Donald S. McClure , and Charles H. Anderson. 15 Dec 78, 6p Rept no. TR-79-3
Contract N00014-76-C-0531
Pub. in Jnl. of Chemical Physics, v70 n11 p4959-4962, 1 Jun 79.

No abstract available.

AD-A075 847/4 Not available NTIS
Hughes Research Labs Malibu Ca
Ground State of F.C.C. Alloys with Multiatom Interactions,
John W. Cahn , and Ryoichi Kikuchi. 18 Nov 78, 8p ARO-13252.4-P
Contract DAAG29-76-C-0026
Availability: Pub. in Acta Metallurgica, v27 01329-1336 1979 (No copies furnished by DTIC).

No abstract available.

AD-A076 022/3 PC **A02**/MF **A01**
Sri International Menlo Park Ca
Metastable Rare Gas Collisions with Molecules.
Summary questionnaire Oct 78-Oct 79,
Keith T. Gillen. 15 Oct 79, 6p
Contract N00014-76-C-0734

This report summarizes recent progress in an experimental investigation of reactive and inelastic scattering of fast metastable rare gas atoms by various target molecules. Detailed investigations have been made of reactons between He *(2 to the first power s), He*(2 to the 3rd power s), and Ar* projectiles and O2 target molecules. Collisional ion-pair formation differential cross sections and electronically and vibrationally inelastic cross sections have been emphasized. Classical trajectory calculations on diabatic potential surfaces have been used to model and interpret the experimental results. (Author)

AD-A076 069/4 PC **A07**/MF **A01**
Illinois Univ At Chicago Circle Dept of Physics
Laser Excitation of Inner-Shell Atomic States by Multiquantum Processes.
Annual summary rept. 1 Aug 78-31 Jul 79,
Charles K. Rhodes, and R. Thomas Hawkins. 31 Oct 79, 126p
Contract N00014-78-C-0625

Multiquantum ultraviolet processes utilizing the available ultrahigh spectral brightness rare gas halogen technology can be used to generate inversion densities 10 to the 15th power/cu cm in the 10-20 eV range. On the basis of current experimental findings we conclude that these nonlinear methods of excitation can be successfully extrapolated to excitations in the 20-50 eV range, the region of excited atomic inner-shell configurations. (Author)

AD-A076 099/1 PC **A02**/MF **A01**
New York Univ N Y Dept of Physics
Study of Collisional Redistribution Using Two-Photon Absorption with a Nearly Resonant Intermediate State,
P. R. Berman , P. F. Liao , and J. E. Bjorkholm.
Sep 79, 14p
Contract N00014-77-C-0553

We report studies of collision-induced features of the 3S(1/2) yields 3P(1/2) yields 4D(3/2) two-photon absorption in atomic sodium vapor undergoing collisionss with several rare gas perturbers. The results yield the collisional redistribution function which describes the nonresonant excitation of the 3P(1/2) intermediate state. Good agreement with theory is obtained only if effects of 3P(1/2) in equilibrium with 3P(3/2) state-changing collisions are included in the calculations. Results are used to obtain a value for a pressure broadening coefficient in the Na-Kr system. (Author)

AD-A076 100/7 PC **A02**/MF **A01**
New York Univ N Y Dept of Physics
The Effects of Velocity-Changing Collisions on Two-Photon and Stepwise Absorption Spectroscopic Lineshapes,
P. R. Berman , P. F. Liao , and J. E. Bjorkholm.
Sep 79, 23p
Contract N00014-77-C-0553

We report the results of an experimental study of the effects of velocity-changing collisions on two-photon and stepwise absorption lineshapes. Excitation spectra for the 3S(1/2) yields 3P(1/2) yields 4D(3/2) transitions of sodium atoms undergoing collisions with foreign gas perturbers are obtained. These spectra are obtained with two cw dye lasers. One laser, the pump laser, is tuned 1.6 GHz below the 3S(1/2) yields 3P(1/2) transition frequency and excites a nonthermal longitudinal velocity distribution of excited 3P(1/2) atoms in vapor. Absorption of the second (probe) laser is used to monitor the steady state excited state distribution which is a result of collisions with rare gas atoms. The spectra are obtained for various pressures of He, Ne, and Kr gases and are fit to a theoretical model which utilizes either the phenomenological Keilson-Stoerer or the classical hard sphere collision kernel. The theoretical model includes the effects of collisionally aided excitation of the 3P(1/2) state as well as effects due to fine-structure state-changing collisions. Although both kernels are found to predict lineshapes which are in reasonable agreement with the experimental results, the hard sphere kernel is found superior as it gives a better description of the effects of large angle scattering for heavy perturbers. Neither kernel provides a fully adequate description over the entire line profile. The experimental data is used to extract effective hard-sphere collision cross sections for collisions between sodium 3P(1/2) atoms and helium, neon and krypton perturbers. (Author)

AD-A076 101/5 PC **A02**/MF **A01**
New York Univ N Y Dept of Physics
Theory of Collisionally Aided Radiative Excitation in Three-Level Systems: A New Interference Effect,
S. Yeh , and P. R. Berman. 23 May 79, 8p
Contract N00014-77-C-0553

Collisionally Aided Radiative Excitation in a three-level atomic system is investigated using a stationary phase method for the case of large atom-field detunings and weak incident fields. It is found that collision-induced coherent phase interference effects can give rise to oscillatory structure in the total absorption cross section as a function of relative speed (energy). An example is given for a specific interatomic potential, indicating that experimental observation of such an effect is feasible. (Author)

AD-A076 102/3 PC **A02**/MF **A01**
New York Univ N Y Dept of Physics
Solvable Model for Optical and Radiative Collisions,
E. J. Robinson. Sep 79, 7p
Contract N00014-77-C-0553

The related problems of optical and radiative collisions are examined theoretically. The actual R to the nth power potentials found in nature are simu-

lated by powers of the hyperbolic secant, which enables one to obtain closed form solutions for the transition probabilities in the weak field regime. (Author)

AD-A076 103/1 PC **A02**/MF **A01**
New York Univ N Y Dept of Physics
Photon Echoes in Standing Wave Fields: Time Separation of Spatial Harmonics,
J.-L. Le Gouet , and P. R. Berman. Sep 79, 18p
Contract N00014-77-C-0553

A calculation is presented to describe the response of an atomic system subjected to two strong standing wave field pulses separated in time. One finds a sequence of output pulses following the input ones, reminiscent of classical photon echoes. A physical picture of the processes involved in echo formation is presented and connection is made with the classical picture of photon echoes. The application of these techniques to collision studies is emphasized. It is shown that studies of echoes produced by standing wave fields can prove advantageous for exploring the effects of small angle scattering on both level populations and atomic coherences. (Author)

AD-A076 137/9 PC **A02**/MF **A01**
Naval Surface Weapons Center White Oak Lab Silver Spring Md
Ion Beam Analysis of Li-B Alloys.
Final rept.,
Donald G. Simons , David J. Land , Matt D. Brown , and James G. Brennan. 1 Mar 79, 18p
Rept no. NSWC/TR-79-95

Proton backscatter analysis has been used to study lithium-boron residues which have been produced by a chemical process designed to extract the free lithium phase from lithium-boron alloys. On the two samples studied there is no evidence of the presence of Li on those surfaces which were in direct contact with the extraction chemicals. This depletion appears to be at least 3.5 microns deep. Measurements on the inside surfaces show that Li is present in a concentration which is in excess of the bound Li content of the samples. (Author)

AD-A076 152/8 PC **A03**/MF **A01**
Purdue Univ Lafayette Ind Dept of Chemistry
Supercooled and Superheated Water.
Technical rept.,
C. A. Angell. Oct 79, 40p
Contract N00014-78-C-0035

Various thermodynamic, transport and structural features of water in its metastable states, both supercooled and superheated, have been determined in recent years, and highly anomalous behavior has been found near the limiting temperatures in each case. For example, the heat capacities increase exponentially at each extreme. In the high temperature extreme this behavior is predictable from van der Waals theory, but the low temperature anomaly is not. The measurements will be reviewed, with emphasis on the more extensively studied supercooled states at normal and high pressure, and evidence will be given that the low temperature anomalies can be described by expressions containing a singular temperature closely associated with the temperature of homogeneous nucleation of ice I. (Author)

AD-A076 240/1 PC **A02**/MF **A01**
Florida Univ Gainesville Dept of Chemistry
Saturation in Laser Excited Atomic Fluorescence Spectrometry: Experimental Verification,
M. B. Blackburn, J.- M. Mermet, G. D. Boutilier, and J. D. Winefordner. 30 Sep 78, 6p AFOSR-TR-79-1000
Contract F44620-76-C-0005
Pub. in Applied Optics, v18 n11 p1804-1807, 1 Jun 79.

No abstract available.

AD-A076 241/9 PC **A02**/MF **A01**
Florida Univ Gainesville Dept of Chemistry
An Evaluation of the Spectral Noise Distribution in Analytical Flames,
K. Fujiwara, A. H. Ullman, J. D. Bradshaw, B. D. Pollard, and J. D. Winefordner. 19 Jul 78, 16p AFOSR-TR-79-1024
Contract F44620-76-C-0005
Pub. in Spectrochimica Acta, v34B p137-150 1979.

No abstract available.

AD-A076 242/7 PC **A02**/MF **A01**
Florida Univ Gainesville Dept of Chemistry
Diagnostic and Analytical Studies of the Inductively Coupled Plasma by Atomic Fluorescence Spectrometry,
N. Omenetto , S. Nikdel , J. D. Bradshaw , M. S. Epstein , and R. D. Reeves. 16 Mar 79, 7p
Contracts F44620-76-C-0005, F33615-78-C-2036
Pub. in Analytical Chemistry, v51 n9 p1521-1525 Aug 79.

No abstract available.

AD-A076 273/2 Not available NTIS
Defence Research Establishment Ottawa (Ontario)
The Application DPASV to the Determination of the Low Temperature Solubility of Lead Sulphate in Sulphuric Acid Solutions,
Eugene M. L. Valeriote, Lloyd D. Gallop, and Pedro J. Aragon. 12 Oct 78, 9p Rept no. DREO-802
Availability: Pub. in Canadian Jnl. of Chemistry, v57 n9 p974-981 1979 (No copies furnished by DTIC).

No abstract available.

AD-A076 275/7 Not available NTIS
Royal Military Coll of Canada Kingston (Ontario) Dept of Chemistry and Chemical Engineering
Reactions of Ozonides. XI. A C Tracer Study of the Ozonolysis of Ethylidenecyclohexane in Cyclohexanone,
Dundappa R. Kerur , and Dennis G. M. Diaper. 19 Mar 73, 5p
Availability: Pub. in Canadian Jnl. of Chemistry, v51 n18 p3110-3113 1973 (No copies furnished by DTIC).

No abstract available.

AD-A076 287/2 PC **A02**/MF **A01**
Massachusetts Inst of Tech Cambridge Dept of Chemistry
Franck-Condon Theory of Chemical Dynamics. VI. Angular Distributions of Reaction Products,
Carlos L. Vila , David J. Zvijac , and John Ross. 23 Jan 79, 16p AFOSR-TR-79-0992
Grant AFOSR-77-3214
Pub. in Jnl. of Chemical Physics, v70 n12 p5362-5375, 15 Jun 79.

No abstract available.

AD-A076 288/0 PC **A02**/MF **A01**
Rice Univ Houston TX Dept of Chemistry
Molecular Beam Reaction of K with HCl: Effect of Rotational State of HCl,
Helmut H. Dispert , Michael W. Geis , and Philip R. Brooks. 9 Mar 79, 4p AFOSR-TR-79-0993
Grant AFOSR-78-3643
Pub. in Jnl. of Chemical Physics, v70 n11 p5317-5319, 1 Jun 79.

No abstract available.

AD-A076 291/4 Not available NTIS
Houston Univ Tx Dept of Chemistry
Chemical Reactions of N2(+) Ion Beams with First-Row Transition Metals,
Gerald M. Lancaster , and J. Wayne Rabalais. 4 Aug 78, 4p ARO-14361.21-C
Grant DAAG29-77-G-0054
Availability: Pub. in Jnl. of Physical Chemistry, v83 n2 p209-212, 25 Jan 79 (No copies furnished by DTIC). Microfiche copies only.

No abstract available.

AD-A076 295/5 PC **A03**/MF **A01**
Illinois Univ At Urbana-Champaign Dept of Chemistry
Magnetic Resonance Spectroscopy at High Pressure,
Jiri Jonas. 1978, 47p AFOSR-TR-79-1030
Grant AFOSR-77-3185
Pub. in Proceedings of NATO ASI, High Pressure Chemistry (1977) Corfu, Greece, p65-110 1978.

No abstract available.

AD-A076 296/3 PC **A02**/MF **A01**
State Univ of New York At Stony Brook Dept of Chemistry
Polymer Conformation by Light Scattering.
Final rept. 1 Sep 68-31 May 79,
Benjamin Chu. 15 Sep 79, 6p ARO-8014.30-C, ARO-13245.13-C
Grants DA-ARO-D-31-124-73-G30, DA-ARO-D-31-124-70-G19
Sponsored in part by Grants DAAG29-76-G-0005 and DAAG29-76-G-1030.

In this project, we tried to study the conformation and dynamics of supramolecular solutions by developing the technique of laser light scattering and by examining the fluid behavior near the critical mixing point. We improved the technique of photon correlation spectroscopy and the method of data analysis so that we succeeded in establishing a new technique for measuring particle size distributions. By relating the tricritical point of fluid mixtures to the theta point in polymer solutions, we could now study polymer solution behavior in the semidilute and gel regions. (Author)

AD-A076 301/1 PC **A02**/MF **A01**
Duke Univ Durham NC Paul M Gross Chemical Lab
Cyclizations Involving Intermediates Obtained by Selective Lithiations.
Final rept. 15 Jun 77-14 Jun 79,
Charles K. Bradsher. 15 Oct 79, 18p ARO-15063.1-C
Grant DAAG29-77-G-0170

The halogen-metal exchange reaction at low temperature can be used to generate organolithium reagents bearing electrophilic groups elsewhere in the molecule has been of importance in the development of novel cyclization reactions. (Author)

ANL-Trans-1166 PC **A03**/MF **A01**
Leningrad State Univ.(USSR).
Kinetic Weight of a Process Which Is One of the Links in the System of a Complex Process. II.
Ya. V. Durdin. 1946, 30p
Contract W-31-109-ENG-38
A, Zh. Obshch. Khim. 16 P1375-1390 1946.

In a former paper treating the question of the kinetical weight of: a process which is one of the links in the system of a complex process, the characteristic of the kinetical weight of the process has been considered, the latter being evaluated from the point of view of the process parameters influence coefficient. This paper deals with the further development of the same question. Having this purpose in mind two more values are introduced, characterizing the kinetic weight of the process: the process equilibrium shift coefficient J exp 0 and the process velocity decrease coefficient eta exp 0 . All three coefficients are determined in a general case not by the ratio between the velocities of the processes but by the ratio between their inertias, each coefficient being equal to the peculiar expression of the partial inertia of this process. In the general case of a non-linear dependence of the velocities of processes A and B on the regulated parameter and ϖ the final value of the equilibrium shift of both processes the three above mentioned coefficients can have different numerical values. In the peculiar case of the linear dependence of the velocities of the small shift of the equilibrium of one of the processes, all three coefficients have the same value. In this case the kinetic weight of the process may be characterized also by the ratio of the processes velocities under the condition that these velocities correspond to the same value of the shift of equilibrium of both processes. The explanation of the kinetic weight of the process may be applied to a case of systems of purely physical processes such as the process of passage of an electric current through two conductors connected in series or the process of heat conduction in two connected in series bars. (ERA citation 04:053469)

ANL-Trans-1168 PC **A02**/MF **A01**
Method of Preparing Cadmium Niobate by a Solid State Reaction.
K. Shimada. Jun 79, 5p
Contract W-31-109-ENG-38

C.

An additive is used to suppress the CdO vaporization during the production of Cd sub 2 Nb sub 2 O sub 7 by a solid-state reaction of the 2 CdO--Nb sub 2 O sub 5 or 2 CdCO sub 3 --Nb sub 2 O sub 5 system. The additive is MgCO sub 3 , Mg(OH) sub 2 , or MgO in an amount giving 0.1 to 5%, and the reaction is carried out at 1000 to 1300 exp 0 C. (ERA citation 04:053493)

ANL-Trans-1175 PC **A03**/MF **A01**
CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France).
Out-of-Pile Studies of Cesium with UO sub 2 , PuO sub 2 , and (U,Pu)O sub 2.
R. Lorenzelli, R. Le Dudal, and R. Atabeck. Apr 79, 33p CONF-790111-7(Trans)
Contract W-31-109-ENG-38
C IAEA-SM--236/87.International symposium on thermodynamics of nuclear materials, Julich, F.R. Germany, 29 Jan 1979.

Purpose of the experiments is to discover the nature of the compounds (U--Cs--O) and (U--Pu--Cs--O) stable under low oxygen potential, as well as the O/M ratio of the matrix in equilibrium with these compounds. The initial stoichiometry of the oxide (in the shape of dense pellets) was varied and the reactions produced in a closed system (sealed nickel tube) with or without an excess of metal cesium. The progress of the cesium-oxide reaction as a function of time is observed by radiography of the reaction tubes after 24, 50, and 300 h between 600 and 1100 exp 0 C. The reaction consumes cesium and results in a swelling of the pellets. The identification of the phase is accomplished by x-ray diffraction, micrography and chemical analysis. UO sub 2 --Cs System: a phase diagram after rapid cooling to room temperature was obtained in (1) UO sub 2 --Cs sub 2 U sub 4 O sub 12 --Cs sub 2 UO sub 4 , (2) UO sub 2 --Cs sub 2 UO/sub 4-x/, and (3) UO sub 2 -x-Cs. The phase x seems to be identical to the one observed by Aitken, but with the formula Cs sub 3 UO sub 4 . PuO sub 2 --Cs System: under low partial pressures of oxygen, no plutonate is obtained; on the contrary, under pressure at about 400 exp 0 C, some isomorphous uranate compounds have been identified (Cs sub 2 Pu sub 4 O sub 13 , Cs sub 4 PuO sub 4). (U,Pu)O sub 2 --Cs System: in the presence of free cesium, the Cs sub 2 M sub 4 O sub 12 phase is in equilibrium with MO sub 2 and, in this phase, the presence of Pu is probable; further, in the presence of an excess of Cs, the dissociation of the oxide mixture with the appearance of PuO sub 2 has not been observed. The O/M ratio of the matrix MO sub 2 corresponds to a slightly sub-stoichiometric oxide, that is, 1.997 +- 0.001. Addition of Rb to Cs in variable proportions has no appreciable effect on the reduction limit. This reduction limit seems confirmed by experiments (UO sub 2 , PuO sub 2 , Cs) simulating the dissociation of PuO sub 2 observed in reactor. (ERA citation 04:053495)

BNL-26111 PC **A03**/MF **A01**
Brookhaven National Lab., Upton, NY.
Laser Photodetachment Spectra of C sub 6 F sub 6- in Nonpolar Liquids.
U. Sowada, and R. A. Holroyd. 1979, 29p CONF-790662-1
Contract EY-76-C-02-0016
International conference on excess electrons and metal-ammonia solutions, Iverness-Shire, UK, 25 Jun 1979.

Aromatic anions absorb in the visible region of the spectrum and energetic considerations suggest that in solution photodetachment may be an important process at these wavelengths. This study reports electron photodetachment cross sections for C sub 6 F sub 6- for wavelengths between 415 and 700 nm. The anion is generated by electron attachment to solute C sub 6 F sub 6 during an x-ray pulse. Detachment is observed as a change in conductivity induced by a subsequent light pulse from a tunable dye laser. The threshold values are reported for tetramethylsilane, n-butane, cyclopentane, n-pentane, 2,2,4-trimethylpentane, 2,2 dimethylbutane, and neopentane. The thresholds are consistent with an electron affinity of 1.09 +- 0.04 eV for the C sub 6 F sub 6 molecule. Comparison of the data to the absorption spectrum of C sub 6 F sub 6- shows that for photon energies above threshold the major process is photodetachment. The relationship of photodetachment data to other properties of the excess electrons in these solvents are discussed. (ERA citation 04:048974)

BNL-26129 PC **A02**/MF **A01**
Bronx Community Coll., NY. Dept. of Chemistry.
Crystal Structure of PrOHSO sub 4.
J. A. Fahey, G. J. B. Williams, and J. M. Haschke. 1979, 12p CONF-790641-6
Contract EY-76-C-02-0016
Rare earth research conference, Fargo, ND, USA, 25 Jun 1979.

PrOHSO sub 4 was prepared by hydrothermal reaction of Pr(OH) sub 3 with Pr sub 2 (SO sub 4) sub 3 x H sub 2 O at 450 to 500 exp 0 C and 1,200 +- 200 atm water pressure. The space group is P2 sub 1 /c; the cell parameters are a = 4.488, b = 12.495, c = 7.091 A, beta = 111.08, Z = 4, d/sub x/ = 4.49 g/cm exp 3 . Atomic coordinates and anisotropic thermal parameters are tabulated. A stereoscopic protection of the cation coordination sphere is shown and discussed. 2 figures, 3 tables. (ERA citation 04:050415)

CALT-63-305 PC **A02**/MF **A01**
California Inst. of Tech., Pasadena.
Dependence of the K X-Ray Energy on the Mode of Excitation.
K. C. Wang, F. Boehm, A. A. Hahn, and P. Vogel. 1977, 8p
Contract EY-76-C-03-0063

The energy shifts in the Ta K x rays resulting from the K-capture of exp 181 W, fluorescence of Ta, and beta exp - decay of exp 181 Hf followed by internal conversion in exp 181 Ta are reported. Both W metal and WO sub 3 on one hand, and Ta metal and Ta sub 2 O sub 5 on the other hand, were used. Comparison of the K x-ray energies of the K-capture sources exp 153 Gd (Eu x rays) and exp 175 Hf (Lu x rays) and the corresponding fluorescence sources was also made. Various effects which may influence the K x-ray energies are discussed. 9 references. (ERA citation 04:053781)

CEA-R-4912 PC **A11**/MF **A01**
CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Genie Radioactif.
Kinetics of Redox Reaction of Neptunium in Nitric Acid - Oxidation of Neptunium (IV) To Neptunium (V) - Oxidation of Neptunium (V) To Neptunium (VI) By Nitric Acid, Catalysed by Nitrous Acid.
These (D. es S.),
J. P. Moulin. Mar 78, 229p
In French.
U.S. Sales Only.

The kinetics of reaction (I): Np exp 4+ + 1/2NO sub 3- + 3/2H sub 2 O implies NpO sub 2+ + 1/2HNO sub 2 + 5/2H exp + is studied by spectrophotometry. As the concentration of iron is lower than 10 exp -6 M, the catalysis by iron is found negligible. The kinetics of reaction (II): NpO sub 2+ + 1/2NO sub 3- + 3/2H exp + reversible NpO sub 22+ + 1/2HNO sub 2 + 1/2H sub 2 O is studied by solvent extraction of neptunium (VI) produced by the reaction. These results are checked with those obtained by spectrophotometry. The rate-low of reaction (II) is shown to depend on the ratio (HNO sub 2) / (Np(V)) - if (HNO sub 2) / (Np(V)) > 1, the reaction is first order with respect to neptunium (V) -if (HNO sub 2) / (Np(V)) < 1, the reaction is zero-order with respect to neptunium (V). A mechanism is proposed, using tetravalent nitrogen as oxidant agent. In this mechanism, we assume that the reactions between nitrogen oxides which produce and consume tetravalent nitrogen have reaction rates similar to that of neptunium (V). The comparison with bibliographical data on oxidation of plutonium (III) by nitric acid shows that these reactions can be zero-order with respect to plutonium (III). A confirmation of the mechanism proposed for neptunium (V) is deduced. (Atomindex citation 10:451540)

CENBG-7721 PC **A05**/MF **A01**
Bordeaux-1 Univ., Gradignan (France). Centre d'Etudes Nucleaires.
Study and Realization of an Electron Gun at Low Energy.
P. Camus. 1977, 90p
In French.Thesis.
U.S. Sales Only.

This work presents the theoretical concepts and experimental design of an electron gun. This gun works in the weak energy range, and the focus position is independent of electron energy measurements. Analysis methods of the electron beam are described. (Atomindex citation 10:449780)

CONF-781063-6 PC **A02**/MF **A01**
Illinois Inst. of Tech., Chicago. Dept. of Chemical Engineering.
Potential Measurements in Acetylide-Containing Melts.
J. Qafisheh, and J. R. Selman. 1978, 3p
Contract EG-77-S-02-4445
Symposium on molten salts, Pittsburgh, PA, USA, 15 Oct 1978.

Present data suggest that the free energy of formation of Li sub 2 C sub 2 is -26 kcal/mol at 700 exp 0 K. However, there is no evidence that the discharge of acetylide ions is reversible, i.e., that acetylide ions are formed by direct reduction of carbon. The carbon electrode is susceptible to mixed potentials. Acetylide ion discharge is strongly diffusion controlled. It appears that acetylide ions in LiCl--KCl eutectic are reasonably stable only in the absence of oxidants such as lithium-intercalated graphite. (ERA citation 04:053482)

CONF-790524-6 PC **A02**/MF **A01**
Argonne National Lab., IL.
Solvation of the Electron in Alcohols Studied Using the Argonne Picosecond Pulse Radiolysis Stem.
C. D. Johah, and G. A. Kenney-Wallace. 1979, 9p
Contract W-31-109-ENG-38
International congress symposium on radiation research and stem cells, Tokyo, Japan, 13 May 1979.

The Argonne picosecond pulse radiolysis system and its application towards understanding solvation processes in polar liquids are described. The alcohols studied are n-butanol, 2-decanol, and t-butanol. (ERA citation 04:050422)

CONF-790538-18 PC **A02**/MF **A01**
Argonne National Lab., IL.
Diffusion and Ionic Conductivity in Solid Electrolytes.
J. N. Mundy. 1979, 6p
Contract W-31-109-ENG-38
Fast ion transport in solids-electrode and electrolytes conference, Lake Geneva, WI, USA, 21 May 1979.

In ionic solids, the most usual experimental method of determining the correlation factor (f) has been a comparison of tracer diffusion and ionic conductivity. Theoretical values of f have been determined for many lattice geometries and jump processes and compared with measured values of f as a means of determining the atomic jump process. This paper considers the problems of applying this technique to solid electrolytes where the concentration of defects responsible for diffusion is comparable to the concentration of the mobile ions. The difficulties of applying the more common experimental techniques are discussed and the present level of theoretical understanding of correlation effects will be outlined. (ERA citation 04:055320)

CONF-790641-8 PC **A02**/MF **A01**
Argonne National Lab., IL.
New Approaches to the Study of Lanthanide/Actinide Chloride: Aluminum Chloride Vapor Phase Complexes.
E. J. Peterson, J. A. Caird, W. T. Carnall, J. P. Hessler, and H. R. Hoekstra. 1979, 8p
Contract W-31-109-ENG-38
Rare earth research conference, Fargo, ND, USA, 25 Jun 1979.

The spectrophotometric technique for vapor density measurements of complexed metal ions has been reformulated to account for temperature dependent effects and multi-species systems. Analysis of vapor pressure information indicates that the NdCl sub 3 --AlCl sub 3 and HoCl sub 3 --AlCl sub 3 systems are adequately explained by the exist-

ence of three vapor species. The two higher molecular weight complexes LnAl sub 4 Cl sub 15 and LnAl sub 3 Cl sub 12 were first proposed by Oeye and Gruen. The newly identified higher temperature species, HoAl sub 2 Cl sub 9 , contributes significantly to the vapor density above 750 exp 0 K and below 3 atm of dimer pressure. In view of the consistency of the Nd exp +3 and Ho exp +3 chemistry the data for the Sm exp +3 system should be viewed with reservation. A new method for vapor density measurements involving use of radioactive tracers has been discussed in terms of its applicability to the study of (Ln,An)Cl sub 3 (AlCl sub 3)/sub x/ systems. (ERA citation 04:053483)

CONF-790658-1 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Some Aspects of the Unimolecular Decarbonylation Reaction of C sub 7 H sub 7 O exp + Cations.
D. H. Russell, D. C. Canada, and E. H. McBay. 1979, 2p
Contract W-7405-ENG-26
27. annual conference on mass spectrometry and allied topics, Seattle, WA, USA, 3 Jun 1979.

This study investigated the unimolecular reaction chemistry of a number of C sub 7 H sub 7 O exp + ions generated from a variety of precursor molecules, e.g., the cresols, substituted benzyl alcohols, and substituted alkyl phenyl ethers. As a model for the heteroatom tropylium ion, the C sub 7 H sub 7 O exp + ion was generated via hydrogen atom loss from the molecular ion of 3,5-cycloheptadienone. The results for metastable kinetic energy release measurements are consistent with different structures for the decomposing C sub 7 H sub 7 O exp + ions. (ERA citation 04:053497)

CONF-790658-5 PC **A02**/MF **A01**
Argonne National Lab., IL.
Photoelectron Spectroscopy of Phthalocyanine Vapors.
J. Berkowitz. 1979, 2p
Contract W-31-109-ENG-38
27. annual conference on mass spectrometry and allied topics, Seattle, WA, USA, 3 Jun 1979.

The He(I) photoelectron spectra of several metal phthalocyanines and metal-free phthalocyanine vapor shows that: a sharp peak at 4.99 eV is an artifact due to ionization of atomic He by He(II) radiation; the first phthalocyanine peak (metal-containing or metal-free) occurs at 6.4 eV; and the metal-like d orbitals lie at least 1 to 2 eV deeper, except in the case of Fe. (ERA citation 04:053498)

CONF-790658-6 PC **A02**/MF **A01**
Argonne National Lab., IL.
Angular Distributions in Molecular Ion Dissociations Observed by Photoelectron-Photoion Coincidence Spectroscopy.
J. H. D. Eland. 1979, 3p
Contract W-31-109-ENG-38
27. annual conference on mass spectrometry and allied topics, Seattle, WA, USA, 3 Jun 1979.

Angular distributions from molecular ion dissociation found previously to be anisotropic, demonstrating that the decay lifetimes are there shorter than the rotation periods, give the expectation that the majority of fast molecular ion dissociations will show angular anisotropies when examined by the coincidence method. 1 reference. (ERA citation 04:053785)

CONF-790658-7 PC **A02**/MF **A01**
Argonne National Lab., IL.
Photoelectron Spectra of Trinuclear Metal Cluster Complexes.
W. C. Trogler, and J. Berkowitz. 1979, 4p
Contract W-31-109-ENG-38
27. annual conference on mass spectrometry and allied topics, Seattle, WA, USA, 3 Jun 1979.

The photoelectron spectra of Re sub 3 Cl sub 9 , Ru sub 3 (CO) sub 12 , and Os sub 3 (CO) sub 12 were studied. Probable molecular structures in the vapor phase are discussed. (ERA citation 04:053484)

CONF-790658-8 PC **A02**/MF **A01**
Argonne National Lab., IL.
PES Of Higher Temperature Vapors.
J. Berkowitz, and C. H. Batson. 1979, 4p
Contract W-31-109-ENG-38
27. annual conference on mass spectrometry and allied topics, Seattle, WA, USA, 3 Jun 1979.

Two types of spectra were obtained on lithium halides, one with essentially the saturated vapor, the other with superheated vapor. Dimer and monomer spectra were derived. The first ionization potential (IP) of dimer is higher than that of monomer in each lithium halide. Calculations predict that trimer has lower IP than dimer, and tetramer has higher IP than trimer. Electron impact measurements on LiF agree with this oscillatory trend, through trimer. A crude ionic model calculation can also rationalize this behavior (assuming hexagonal trimer and distorted cube for tetramer). (ERA citation 04:053485)

CONF-790690-3 PC **A04**/MF **A01**
Los Alamos Scientific Lab., NM.
Quantitative Comparison of Multiple-Photon Absorption in Polyatomic Molecules.
O. P. Judd. 1979, 54p
Contract W-7405-ENG-36
International conference on laser spectroscopy, Rottach-Egern, Tegernsee, F.R. Germany, 11 Jun 1979.

A quantitative comparison of multiple-photon absorption for a number of polyatomic molecules has been performed. A basis for this comparison has been developed that takes into account the different experimental conditions and molecular parameters, and provides suitable normalization of the fluence and absorption parameters. The normalization, and consequently the generalized interaction process can be specified in terms of the spectroscopic absorption cross section of the molecule sigma sub 0 (nu) and the effective fraction of molecules that interact with the radiation field <f>. The results of the study indicate that in terms of the normalized absorption variables, multiple-photon absorption is a general phenomena that is qualitatively the same for all molecules; quantitative differences can be related to differences in sigma sub 0 and <f>. The absorption of all polyatomic molecules can be described in terms of the number of photons absorbed per molecule eta(PHI) at a fluence PHI. The data indicate that in spectral regions where sigma sub 0 (nu) greater than or equal to 0.1 sigma sub 0 (max), eta(PHI) can be represented by the function PHI/sup gamma / where gamma = 1 for sigma sub 0 PHI/ <f> < 1 and gamma approx. = 2/3 for sigma PHI/ <f> > 1. Quantitative values of <f> and the functional dependence of eta(PHI) on the experimental parameters such as gas pressure, optical bandwidth, and optical pulse duration are derived and shown to be in good agreement with experimental data for SF sub 6 . These results are also compared with the anharmonic oscillator model for multiple-photon excitation of polyatomic molecules. (ERA citation 04:055660)

CONF-790861-5 PC **A02**/MF **A01**
Argonne National Lab., IL.
Atomic Processes Pertinent to Radiation Physics.
M. Inokuti. 1979, 15p
Contract W-31-109-ENG-38
11. international conference on the physics of electronic and atomic collisions, Kyoto, Japan, 29 Aug 1979.

The physics of electronic and atomic collisions is a key element in the understanding of action of ionizing radiation on matter. Studies on radiation action in turn are fundamental to various aspects of the nuclear fission and fusion energy technology, most notably its health aspect. The lecture illustrates through selected examples the use of electron-collision cross-section data in radiation physics. The cross-section data for this use must be absolute and comprehensive (i.e., referring to all major final states of a target atom or molecule and covering a wide range of independent variables such as incident energy). For the determination of a comprehensive and trustworthy set of electron-collision cross-section data for a given atom or molecule, various theoretical constraints prove to be useful. Various outstanding problems, both experimental and theoretical, are suggested for work in the near future. (ERA citation 04:055662)

COO-1198-1270 PC **A02**/MF **A01**
Illinois Univ., Urbana.
High Pressure Luminescence Studies.
H. G. Drickamer. 1979, 7p CONF-790709-15
Contract EY-76-C-02-1198
VII international AIRAPT conference, La Creusot, France, 30 Jul 1979.

High pressure luminescence studies have proven very powerful in characterizing electronic states and excitations and in testing theories. Examples are given related to physics, chemistry and biology. The first problem treated concerns tests of a model for the Jahn-Teller effect involving heavy metal ions in alkali halides. This is a problem in solid state physics. The second problem relates to both inorganic chemistry and solid state physics. We discuss the luminescence efficiency if Eu exp +3 in the La sub 2 O sub 2 S lattice. These phosphors are important technologically. The next two problems arise in physical-organic chemistry. One involves the effect of viscosity on luminescence efficiency of dye molecules, with possible interactions. The other concerns singlet-triplet interactions in aromatic molecules. The final problem has implictions for protein chemistry as well as for the solution chemistry of organic molecules in aqueous solutions. It concerns the covalent interaction of ligands with polymeric substrates. (ERA citation 04:053782)

COO-2190-19 PC **A02**/MF **A01**
Utah Univ., Salt Lake City.
Dynamics and Mechanisms of Hot Chemistry Stimulated by Recoil Methods. Progress Report, March 1, 1978--February 28, 1979.
L. D. Spicer. Nov 78, 17p
Contract EY-76-S-02-2190

The nuclear recoil chemical activation process in cyclobutane-t and subsequent inter- and intra-molecular energy transfer in recoil tritium and recoil chlorine hot reaction systems are analyzed. A stepladder model for intermolecular energy transfer from cyclobutane-t on collision shows average quanta of energy transferred range from 0.5 to 10 kcal/collision in He, N sub 2 , CO sub 2 and cyclobutane bath gases. The recoil energy spectrum of hot chlorine atoms generated via the exp 37 Cl(n, gamma) exp 38 Cl reaction is also reported. The average recoil energy is found to be 294 eV and the maximum is 528 eV. Average reaction energy is calculated to be relatively independent of composition over the range from 0 to 99% moderation with noble gases in well scavenged systems of moderate reactivity. Geometrical isomerization accompanying the gas phase chlorine atom replacement reaction in 2,3 dichlorohexafluoro-2-butene as a function of moderation has been further investigated. A thermal or near thermal reaction path having a trans/cis product ratio of 1.3 and a high energy process which preferentially forms trans product from both cis and trans reactant are found. Dynamical features associated with the observed high energy inverse isotope effect in the reaction of chlorine atoms with H sub 2 and D sub 2 have been investigated through a non-Boltzmann rate constant analysis. The origin of this kinetic isotope effect is attributed to the secondary reactive process of collisional dissociation of translationally, vibrationally, and rotationally excited hydrogen chloride product molecules. Investigation of the kinetics and mechanisms of photochemical reactions between sulfur dioxide and aliphatic hydrocarbons has been initiated. (ERA citation 04:052061)

COO-2807-16 PC **A02**/MF **A01**
Kansas State Univ., Manhattan. Dept. of Chemistry.
Experimental Investigation of the Chemistry of Excited States of Rare Gases. First Quarterly Progress Report, 15 October 1978--15 January 1979.
D. W. Setser. Mar 79, 9p
Contract EY-76-S-02-2807

Analysis of XeF(B) and XeF(C) state quenching from photodissociation of XeF sub 2 was continued and progress was made on reactive quenching of the resonance states, Xe(exp 3 P sub 1) and Kr(exp 3 P sub 1). The study of the reactions of the resonance states of the rare gases was concentrated on the Kr* + Cl sub 2 reaction. (ERA citation 04:053506)

COO-2873-3 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge.

Theory of Chemical Kinetics. Progress Report, January 16, 1978-January 15, 1979.
J. Ross. Jan 79, 10p
Contract EY-76-S-02-2873

The Franck-Condon approximation was applied to chemical dynamics with success. It was used to study angular distributions of reaction products in atom-diatom reactions. Long-range transitions in stochastic models were considered. The hydrodynamic stability of stationary and oscillatory convection in binary fluids was studied. Efficiency of thermal engines was also studied. (ERA citation 04:053486)

COO-3127-30-T1 PC **A07**/MF **A01**
Brooklyn Coll., NY. Dept. of Chemistry.
Approximation Methods for the Partition Functions of Anharmonic Systems.
P. Lew, and T. Ishida. Jul 79, 132p
Contract EY-76-S-02-3127
Thesis.

The analytical approximations for the classical, quantum mechanical and reduced partition functions of the diatomic molecule oscillating internally under the influence of the Morse potential have been derived and their convergences have been tested numerically. This successful analytical method is used in the treatment of anharmonic systems. Using Schwinger perturbation method in the framework of second quantization formulism, the reduced partition function of polyatomic systems can be put into an expression which consists separately of contributions from the harmonic terms, Morse potential correction terms and interaction terms due to the off-diagonal potential coefficients. The calculated results of the reduced partition function from the approximation method on the 2-D and 3-D model systems agree well with the numerical exact calculations. (ERA citation 04:053793)

COO-3221-58 PC **A03**/MF **A01**
Hebrew Univ., Jerusalem (Israel). Dept. of Physical Chemistry.
Partitioning of Electrostatic and Conformational Contributions in the Redox Reactions of Modified Cytochromes C.
Y. Ilan, A. Shafferman, B. A. Feinberg, and Y. K. Lau. 1979, 30p
Contract EY-76-C-02-3221

The reduction of acetylated, fully succinylated and dicarboxymethyl horse cytochromes c by the radicals CH sub 3 CHOH, CO sub 2 , O sub 2 , and e exp - /sub aq/, and the oxidation of the reduced cytochrome c derivatives by Fe(CN) sub 63- were studied using the pulse radiolysis technique. Many of the reactions were also examined as a function of ionic strength. By obtaining rate constants for the reactions of differently charged small molecules redox agents with the differently charged cytochrome c derivatives at both zero ionic strength and infinite ionic strength, electrostatic and conformational contributions to the electron transfer mechanism were effectively partitioned from each other in some cases. In regard to cycochrome c electron transfer mechanism, the results, especially those for which conformational influences predominate, are supportive of the electron being transferred in the heme edge region. (ERA citation 04:052056)

COO-3221-59 PC **A02**/MF **A01**
Hebrew Univ., Jerusalem (Israel). Dept. of Physical Chemistry.
Decay of Peroxy Radicals of Methanol and Isopropanol in the Presence of Copper Ions and Superoxide Dismutase. Progress Report, December 1, 1978--November 30, 1979.
Y. A. Ilan, Y. Ilan, and G. Czapski. 1979, 6p
Contract EY-76-C-02-3221

The decay of the peroxy radicals produced from methanol and isopropanol was followed in the presence and in the absence of Cu exp 2+ ions, and the enzyme Superoxide Dismutase. The results indicate that both Cu exp 2+ and Superoxide do not affect the decay of the alcohol peroxy radicals. They catalyze the decay of O exp -2 radicals which are formed from the alcoholic peroxy radicals, and which absorb light at the same wavelengths region as these radicals. This catalysis enables the resolution of the decay of the alcoholic peroxy radicals, without the interference of absorption changes originating in the decay of HO sub 2 and O exp -2 radicals. (ERA citation 04:053512)

COO-4254-2 PC **A02**/MF **A01**
Northwestern Univ., Evanston, IL.
Properties of Supported Metal Catalysts. Progress Report, April 1--June 30, 1979.
R. L. Burwell, Jr., J. B. Butt, and J. B. Cohen.
Mar 79, 25p
Contract EG-77-S-02-4254

The preparation and characterization of supported platinum catalysts has been extended to a series of alumina-supported catalysts similar to the previously investigated platinum--silica series. Characterization has been carried out via hydrogen chemisorption, hydrogen--oxygen titration, hydrogenolysis of methylcyclopropane and deuterium exchange with cyclopentane. In all, some twenty catalysts, with platinum percentage exposed ranging from 4.1 to 103% have been prepared and characterized. As was the case for the silica supported platinum, the specific conditions of catalyst pretreatment have been found to affect substantially the structure sensitive behavior in all cases. In addition, the thermal conditions employed in catalyst preparation affect the nature of structure sensitive behavior, which was not the case for Pt/SiO sub 2 . Substantial effort has been devoted to the development of a suitable system for making x-ray measurements in controlled atmospheres. Several of the Pt/SiO sub 2 catalysts have been investigated in hydrogen atmospheres, with the curious result that the apparent loading of metal detected in hydrogen is lower than that determined in air (which agreed with the value determined in preparation). (ERA citation 04:053487)

COO-4381-7 PC **A02**/MF **A01**
Arizona Univ., Tucson. Opticai Sciences Center.
Metal Silver-Liquid Interface: Oxide Properties from Reflectance and Scattered Light Spectroscopy.
D. K. Cohen, S. O. Sari, and K. D. Scherkoske.
1979, 8p CONF-790538-14
Contract EG-77-S-02-4381
Fast ion transport in solids-electrode and electrolytes conference, Lake Geneva, WI, USA, 21 May 1979.

Electrochemically oxidized silver foils have been examined using a reflectance and scattered light spectroscopy. The effect of unintentional inhomogeneous oxide formation on rough silver metal reflecitivty is given. In contrast, the reflectance contribution of an intentionally formed oxide overlayer may be separated from that of the metal substrate. If the scattering contribution of the oxide-covered silver is small, the differential reflectance between oxidized and clean metal foils may be used to determine the approximate overlayer optical constants. The distribution of oxide module sizes at the metal boundary may be estimated from contributions due to inhomogeneous oxide residues. These results are compared to electron microscopy of the same surfaces. (ERA citation 04:051960)

COO-4695-2 PC **A02**/MF **A01**
Utah Univ., Salt Lake City. Dept. of Chemistry.
Energy Dispersion and Relaxation in Propynal Using Laser IR/Visible Double Resonance.
M. L. Lesiecki, G. R. Smith, J. A. Stewart, and W. A. Guillory. 1979, 18p CONF-790919-1
Contract ER-78-S-02-4695
14. European congress on molecular spectroscopy, Frankfurt, F.R. Germany, 3 Sep 1979.

The dynamics of energy dispersion in propynal has been studied over the pressure range of 5 to 500 mtorr following excitation by a TEA CO sub 2 laser below the dissociation threshold. Wavelength resolved spectra, using the dye laser-induced fluorescence technique, are used to characterize the vibrational levels that are involved in the various energy transfer processes, while time-resolved spectra are used to determine the corresponding rates. The rate constants are extrapolated to zero pressure to obtain the regime of collisionless intramolecular relaxation time. Mechanisms of energy dispersion involving each of the probed vibrational levels (v = 0, nu sub 6 (v = 1), nu sub 9 (v = 1), and nu sub 4 (v = 1)) are discussed. (ERA citation 04:055326)

COO-4974-1 PC **A02**/MF **A01**
Brown Univ., Providence, RI.
Interactions of Molecules with Surfaces. Progress Report, August 1, 1978--April 30, 1979.
E. F. Greene. Apr 79, 13p
Contract ER-78-S-02-4974

An apparatus is being set up to measure the elastic scattering of a velocity selected beam of Kr atoms from the surface of a graphite crystal. The angular distribution and energy dependence of the scattering will be compared with the predictions of a simple model to learn about the nature of the surface. The yields of positive ions produced when beams of neutral alkali atoms hit hot surfaces of silicon or alumina have been measured for various temperatures of the surfaces. A quasi-equilibrium model for the ionization fits the results for Si well but is inadequate in the case of Al sub 2 O sub 3 . In the latter case the ion yield is increased somewhat in the presence of visibe radiation, and some of the dynamics of the ionization process may be measurable. Decomposition and polymerization reactions are found to occur when molecules of high kinetic energies are suddenly stopped by hitting a surface. The yields of products depend on the internal as well as the kinetic energy. Beams of CCl sub 4 , C sub 2 Cl sub 6 and trioxane have been studied. (ERA citation 04:053775)

CRN-CNPA-77-25 PC **A02**/MF **A01**
Strasbourg-1 Univ. (France). Centre de Recherches Nucleaires.
Isotopic Exchange in a Neutron-Irradiated Mixed-Valence Compound: Tl sub 3 (i) Tl(III)Cl sub 6.
S. Fernandez Valverde, and G. Duplatre. 1977, 10p
U.S. Sales Only.

The initial distribution of Tl(I) and Tl(III) species, and its change on heating, have been investigated in solid thermal neutron-irradiated Th sub 4 Cl sub 6 . An initial ratio of 5/1 for exp 204 Tl(I)/ exp 204 Tl(III) is found and this remains constant for integral gamma-doses of 3 to 12 MRad. The variation of the exp 204 Tl(III) fraction with temperature is found identical to that observed in labelled Tl sub 4 Cl sub 6 for which a genuine isotopic exchange has previously been described. It is concluded that the recoil species are rapidly converted, after the recoil processes, into stable ions. (Atomindex citation 10:447910)

DOE/ER/04927-1 PC **A03**/MF **A01**
Arizona Univ., Tucson.
Chlorophyll Photochemistry in Condensed Media: Triplet State Quenching and Electron Transfer to Quinone in Cellulose Acetate Films.
G. Cheddar, F. Castelli, and G. Tollin. 1979, 26p
Contract ER-78-S-02-4927

Chlorophyll a was incorporated into cellulose acetate films and the triplet decay and electron transfer to p-benzoquinone in aqueous solution was studied using laser flash photolysis and ESR. The triplet was found to decay by first order kinetics with the same rate constant regardless of chlorophyll concentration, but the yield was concentration dependent. This is due to quenching at the ground and/or singlet state levels. In the presence of quinone, the triplet is quenched and, when the quinone is in an aqueous solution in contact with the film, chlorophyll cation radical (C. exp +) as well as the semiquinone anion radical (Q. exp -) can be observed. The C. exp + decays by second order kinetics with a rate constant of 1.5 x 10 exp 6 M exp -1 sec exp -1 . Although triplet conversion to radicals is slightly lower in the films as compared to homogeneous solutions (approx. 3 times), the lifetimes of the radicals are greatly increased (approx. 10 exp 3 times). (ERA citation 04:052054)

DP-MS-79-29 PC **A02**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Preparation and Moessbauer Spectra of Np(III): Alkali Metal Chlorocompounds.
D. G. Karraker, and J. A. Stone. 1979, 8p CONF-790917-5
Contract EY-76-C-09-0001
American Chemical Society national meeting, Washington, DC, USA, 10 Sep 1979.

M sub 2 NpCl sub 5 , MNp sub 2 Cl sub 7 (M = K, NH sub 4 , Rb) and NpCl sub 3 4CH sub 3 CN were

prepared by zinc amalgam reduction of NpCl sub 4 -MCl in 50:1 acetonitrile-propionic acid solutions. The exp 237 Np Moessbauer spectra of these compounds showed quadrupole interactions, with Moessbauer parameters delta = 3.4 to 3.5 cm/sec and 1/4eqQ = 0.5 to 0.7 cm/sec. Moessbauer spectra established that preparations analyzing as MNpCl sub 4 CH sub 3 CN were mixtures of M sub 2 NpCl sub 5 and NpCl sub 3 4CH sub 3 CN. (ERA citation 04:055339)

EUR-5868 PC **A06**/MF **A01**
Commission of the European Communities, Brussels (Belgium).
Developments in Quantitative Electron Probe Microanalysis.
R. Tixier. 1977, 109p
In French.
U.S. Sales Only.

A study of the range of validity of the formulae for corrections used with massive specimen analysis is made. The method used is original; we have shown that it was possible to use a property of invariability of corrected intensity ratios for standards. This invariance property provides a test for the self consistency of the theory. The theoretical and experimental conditions required for quantitative electron probe microanalysis of thin transmission electron microscope specimens are examined. The correction formulae for atomic number, absorption and fluorescence effects are calculated. Several examples of experimental results are given, relative to the quantitative analysis of intermetallic precipitates and carbides in steels. Advances in applications of electron probe instruments related to the use of computer and the present development of fully automated instruments are reviewed. The necessary statistics for measurements of X ray count data are studied. Estimation procedure and tests are developed. These methods are used to perform a statistical check of electron probe microanalysis measurements and to reject rogue values. An estimator of the confidence interval of the apparent concentration is derived. Formulae were also obtained to optimize the counting time in order to obtain the best precision in a minimum amount of time. (Atomindex citation 10:451388)

FE-2028-11 PC **A05**/MF **A01**
Delaware Univ., Newark. Dept. of Chemical Engineering.
Kinetics and Mechanism of Desulfurization and Denitrogenation of Coal-Derived Liquids. Ninth Quarterly Report, June 21, 1977--September 20, 1977.
B. C. Gates, J. R. Katzer, J. H. Olson, H. Kwart, and A. B. Stiles. 1 May 78, 79p
Contract EX-76-C-01-2028

Flow reactor studies of HDS of dibenzothiophene at about 300 exp 0 C and 100 atm have shown a new dependence of catalyst activity on H sS concentration at low values. We infer that the catalyst undergoes structural changes during reaction, sometimes becoming sulfur deficient and relatively inactive. It is evidently necessary to maintain the catalyst in a properly sulfided state during reactor startup and operation by avoiding its contacting too little H sub 2 S. The relative activities of Ni--Mo/Al sub 2 O sub 3 , CO--Mo/Al sub 2 O sub 3 , and Ni--W/Al sub 2 O sub 3 catalysts for HDN of acridine have been determined, showing that Ni--Mo/Al sub 2 O sub 3 is the most active. The results are interpreted inthe context of the acridine reaction network, in which both the hydrogenation and hydrogenolysis (cracking) reactions are kinetically important. (ERA citation 04:052431)

GEPP-TIS-443 PC **A03**/MF **A01**
General Electric Co., St. Petersburg, FL. Neutron Devices Dept.
Obtaining Numerical Values for the Elliptic Emission Functions Used in Calculating Electron Emission from Surfaces.
H. C. Miller. 7 Sep 79, 37p
Contract EY-76-C-04-0656

The four elliptic emission functions v(y), t(y), s(y) and theta(y) (or f/sub mg/(y)) are used in calculating electron emission from surfaces under the influence of temperature and external electric fields. Critical evaluations are made of the published tables of these functions. Several existing approximation equations for the emission functions are given together with some additional polynomial approximations. The estimated accuracies of these approximation equations range from five to six significant figures for the most complex approximations to +-1% or so for the simplest. (ERA citation 04:053776)

GEPP-TIS-444 PC **A02**/MF **A01**
General Electric Co., St. Petersburg, FL. Neutron Devices Dept.
X-Ray Emission Spectroscopic Determination of Iron in a Polyurethane Encapsulant Curing Agent.
J. M. Carter, and E. N. Kling. 15 Aug 79, 8p
Contract EY-76-C-04-0656

Presented is a procedure for determining the iron content in a polyurethane encapsulant curing agent by x-ray emission spectroscopy. Standards were prepared by adding ferric acetyl acetonate to a curing agent of identical composition to that being analyzed, but containing no iron. Results show that x-ray emission spectroscopy is feasible for determination of iron in the 30 to 50 ppM range. This range could probably be extended by the preparation of additional standards. Precision of the method is approximately 1.2 ppM at the 99 percent confidence level. (ERA citation 04:053475)

GEPP-TIS-455 PC **A02**/MF **A01**
General Electric Co., St. Petersburg, FL. Neutron Devices Dept.
Determination of Percent Calcium Carbonate in Calcium Chromate.
H. W. Middleton. 27 Aug 79, 18p
Contract EY-76-C-04-0656

The precision, accuracy and reliability of the macro-combustion method is superior to the Knorr alkalimetric method, and it is faster. It also significantly reduces the calcium chromate waste accrual problem. The macro-combustion method has been adopted as the official method for determination of percent calcium carbonate in thermal battery grade anhydrous calcium chromate and percent calcium carbonate in quicklime used in the production of calcium chromate. The apparatus and procedure can be used to measure the percent carbonate in inorganic materials other than calcium chromate. With simple modifications in the basic apparatus and procedure, the percent carbon and hydrogen can be measured in many organic material, including polymers and polymeric formulations. 5 figures, 5 tables. (ERA citation 04:053474)

GJBX-56(79) PC **A05**/MF **A01**
Department of Energy, Grand Junction, CO. Grand Junction Office.
Uranium in Coal.
J. F. Facer, Jr. May 79, 78p
Contract EY-76-C-13-1664

United States production of coal in 1977 was 695 million short tons of which 477 million tons were burned in power plants. The ash from these power plants was about 67 million tons containing an estimated 900 tons U sub 3 O sub 8 , assuming 14 percent ash from the type of coal used by utilities and 12 ppM U contained in ash. Perhaps 1 to 3 percent of the domestic uranium requirement could be met from coal ash, provided processing technology could be developed for uranium recovery at acceptable costs. However, the environmental problems for disposal of the slimy leached ash would be enormous. The average uranium grade of coal in the United States is less than half of that of the Earth's crust. Burning the coal concentrates the contained uranium in the ash from 2 to 20 times. However, even at 20 times concentration, the percent uranium in coal ash is less than 1/100 of the grade of the uranium ore being processed today from conventional deposits. Although it is conceivable that some coal ash might contain enough uranium to make the ash an economic source of uranium, this is not now the case for ash from any major coal-fired power plant in the United States. During 1963 to 67, about 180,000 tons of uranium-bearing carbonaceous rock from the southwestern part of the Williston Basin were mined and processed to recover about 1 million pounds of U sub 3 O sub 8 . None of this material has been mined since 1967. The uranium reserves of the area are small, and the environmental problems with calcining the lignitic material may be prohibitive. Some other uraniferous coal and lignite could be mined and processed as a uranium ore, but less than half of one percent of the domestic $30 reserves are in coal. A few samples of midcontinent coal have been reported to contain about 100 ppM U but little is known about the size of such deposits or the likelihood that they will be mined and used for power plant fuel to produce a high-uranium ash. (ERA citation 04:048067)

IDO-12083 PC **A03**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
Program and Abstracts of Twenty-Third Annual Conference on Bioassay, Environmental, and Analytical Chemistry.
1977, 37p CONF-770926-(absts)
23. annual conference on bioassay, environmental and analytical chemistry, Moran, WY, USA, 15 Sep 1977.

Abstracts are presented for 29 papers, covering topics related to assay for Pu and other radionuclides, and contamination problems in radiochemical analysis. (ERA citation 04:048958)

INIS-mf-4895 PC **A07**/MF **A01**
Amsterdam Univ. (Netherlands).
Methods for Estimating the Enthalpy of Formation of Inorganic Compounds; Thermochemical and Crystallographic Investigations of Uranyl Salts of Group VI Elements.
N. P. Brandenburg. 28 Jun 78, 141p
Proefschrift (Dr.).
U.S. Sales Only.

The first part of this thesis is concerned with parameter methods for estimating the standard enthalpy of formation, delta H exp 0 sub(f), of inorganic compounds. In this type of method the estimate is a function of parameters, assigned to cation and anion, respectively. The usefulness of a new estimation method is illustrated in the case of uranyl sulphide. In the second part of this thesis crystallographic and thermochemical properties of uranyl salts of group VI elements are described. Crystal structures are given for beta -UO sub 2 SO sub 4 , UO sub 2 SeO sub 3 , and alpha -UO sub 2 SeO sub 4 . Thermochemical measurements have been restricted to the determination of delta H exp 0 sub(f)(UO sub 2 SO sub 3) and delta H exp 0 sub(f)(UO sub 2 TeO sub 3) by means of isoperibol solution calorimetry. (Atomindex citation 10:451414)

INIS-mf-4900 PC **A04**/MF **A01**
Katholieke Univ. Nijmegen (Netherlands).
Experimental Investigations of Hydrogen Cluster Ions.
H. A. van Lumig. 2 Nov 78, 71p
Proefschrift (Dr.).
U.S. Sales Only.

Experiments to obtain information about the structure and stability of small hydrogen cluster ions have been performed. Attenuation and fragmentation measurements are presented of hydrogen cluster ions colliding with nitrogen, argon, hydrogen and helium over fixed energy ranges. The total collision and differential fragmentation cross sections are tabulated. (Atomindex citation 10:450388)

INIS-mf-4907 PC **A06**/MF **A01**
Bochum Univ. (Germany, F.R.). Abt. fuer Physik und Astronomie.
Experimental Studies to Detect Metallic Impurities in Plasmas by Means of Fluorescence Spectroscopy.
A. Elbern. 15 Dec 76, 115p
In German.Diss. (D.Sc.).
U.S. Sales Only.

This paper deals mainly with the detection by fluorescence spectroscopy of small atom densities (10 exp 7 -10 exp 9 cm exp 3) produced by atomization of metals by high-energy ions. For this purpose a commercial flashlamp-pumped dye laser (about 300 kW peak output at 6000 A and about 0,5 mu sec pulse duration) is applied, which, after doubling of frequency, excites the resonance transitions of the metal atoms in the near UV range and saturates them by its high intensity. The dependence of the fluorescent light on the intensity

and the spectral structure of the laser and on the atom type was studied theoretically and experimentally. It was shown that the time dependence of the fluorescent pulse did not correspond with the theoretical model derived by making simplified assumptions. This deviation could be explained by the spatial inhomogeneities and the time-dependent spectral structure of the dye laser. The intensity of the fluorescent light emitted by the metal atoms proved, however, to be proportional to the atom density existing in the scattering volume, as was expected. (Atomindex citation 10:450619)

IPNO-RC-77-13 PC **A05**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
New Properties of Thorium Tetrabromide.
M. Genet, R. Carlier, M. Hussonnois, J. C. Krupa, and P. Delamoye. 1977, 76p
In French.
U.S. Sales Only.

Most of already known chemical and physical properties of ThBr sub 4 have been reviewed and a survey of new properties investigated at I.P.N. and dealing more with nuclear and spectroscopy field is presented. ThBr sub 4 preparation, single crystal production as well as fluorescent properties are described. Then, nuclear aspect is studied mainly for ThBr sub 4 response to various charged particles versus energy. Attention is drawn on ThBr sub 4 performances and limits in heavy ion detection. Self-excited alpha spectrum of ThBr sub 4 induced by natural thorium radioactivity is reported. Specific properties of ThBr sub 4 as a matrix for spectroscopic studies are discussed. Preliminary results about absorption and emission spectra at 4K of ThBr sub 4 crystal doped with U exp +4 (1 per mille) are presented. The projects in spectroscopy field using ThBr sub 4 and other tetravalent actinide dopants (Pa exp +4 , Np exp +4 , Pu exp +4 , etc) are described. Then, theoretical support needed for spectrum interpretation is briefly given. Finally, bibliography about 5 f element spectroscopy in various matrixes is included. (Atomindex citation 10:447915)

IPNO-78-01 PC **A02**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
Electron Beam Density of CRYEBIS FRECH 2 Electron Gun.
M. Abd el Baki, and C. Goldstein. 1978, 19p
U.S. Sales Only.

This report gives a method to calculate by computer-programming the FRECH II-electron beam density. This method consists in taking current measurements on a 1/10 mm tungsten-wire, to determine the electron-beam density profile. (Atomindex citation 10:449766)

IS-T-860 PC **A04**/MF **A01**
Ames Lab., IA.
Pulse and Multiple Pulse N.M.R. Studies of Crystallinity and Molecular Dynamics of Solid State Polymers.
A. J. Paff. May 79, 64p
Contract W-7405-ENG-82

Pulse and multiple pulse N.M.R. techniques were used to study polypropylene and polyethylene. The degree of crystallinity of two polypropylene samples was investigated by analyzing the time decays of a simple pi /2 pulse and the more complex eight-pulse cycle. The single pulse experiment gives the superposition of two decays, the short component being attributed to the rigid region while the long component to the mobile region. Heating of the samples to 88 exp 0 Cproduced a situation where the rigid and mobile regions become synonymous with the crystalline and noncrystalline regions. The eight pulse cycle will only average the homonuclear dipole-dipole interactions, H/sub D/, only at observation times nt/sub c/, when the criteria t/sub c/ absolute value of H/sub D/ << 1 is met. With the selection of the appropriate cycle time, t/sub c/, of 72 mu s only the magnetization of the noncrystalline region will be monitored. The application of the eight pulse cycle, seventeen pulse cycle, -M/sub x/ phase pull sequence, and P/sub x/ - M/sub y/ phase pull sequence allowed for a variety of interaction Hamiltonians of polyethylene to be investigated. (ERA citation 04:053500)

IS-T-868 PC **A10**/MF **A01**
Ames Lab., IA.
Applications of Pulsed Nuclear Magnetic Resonance to Chemistry: Multiple-Pulse NMR, Cross Polarization, Magic-Angle Spinning Annd Instrumental Design.
P. D. Murphy. Jul 79, 225p
Contract W-7405-ENG-82

Pulsed Nuclear Magnetic Resonance (NMR) has been applied to: (1) Measurements of the prinicpal components of the proton shielding tensors of the hydrides of zirconium chloride and zirconium bromide. Multiple-Pulse techniques have been used to remove static homonuclear dipolar coupling. The anisotropies and isotropic shifts of these tensors have been used to infer the possible locations of the hydrogen within the sandwich-like layers of these unusual compounds. (2) Studies of the oscillatory transfer of magnetic polarization between exp 1 H and exp 29 Si in substituted silanes. The technique of J Cross Polarization has been used to enhance sensitivity. The exp 29 Si NMR shifts of -Si-O- model compounds have been investigated as a possible probe for future studies of the environment of bound oxygen in coal-derived liquids. (3) Measurements of the aromatic fraction of exp 13 C in whole coals. The techniques of exp 1 H-exp 13 C Cross Polarization and Magic-Angle Spinning have been used to enhance sensitivity and remove shift anisotropy. Additional topics described are: (4) Calculation and properties of the broadened lineshape of the shileding Powder Pattern. (5) Calculation of the oscillatory transfer of magnetic polarization for an I-S system. (6) Numerical convolution and its uses. (7) The technique of digital filtering applied in the frequency domain. (8) The designs and properties of four NMR probe-circuits. (9) The design of a single-coil double-resonance probe for combined Magic-Angle Spinning and Cross Polarization. (10) The designs of low Q and high Q rf power amplifiers with emphasis on the rf matching circuitry. (ERA citation 04:055316)

ITEF-125(1978) PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoj Energii SSSR, Moscow. Inst. Teoreticheskoi i Eksperimental'noi Fiziki.
Beam Emittance Increasing in the Pierce Electron Gun.
V. A. Batalin. 1978, 17p
In Russian.
U.S. Sales Only.

The effect on beam emittance increasing in the Pierce electron gun is evaluated to study the dynamics of intense beams of charged particles using a thermodynamic approach. An electron beam in the electrostatic field used in the Pierce optics is considered. It is assumed that the beam profile remains constant; particles do not have initial longitudinal velocities, the transverse beam emittance is equal to zero. The dependence of the ratio of the beam temperature at the output of the Pierce electron gun and its initial value on the initial beam temperature for the positive and Joule-Thompson negative effect is presented. It is shown that the Joule-Thompson effect increases with the decrease of the initial beam temperature. The conclusion is drawn that at transverse beam temperature lower than 0.1 eV the emittance increasing can become substantial even in Pierce optics having no aberrations. (Atomindex citation 10:452560)

K/ET-252 PC **A03**/MF **A01**
Oak Ridge Gaseous Diffusion Plant, TN.
Some Considerations in the Handling of Fluorine and the Chlorine Fluorides.
R. L. Farrar, Jr., and E. J. Barber. 10 Jul 79, 46p
Contract W-7405-ENG-26

This paper reviews many considerations in the safe handling of fluorine and the chlorine fluorides. The physical, chemical, and toxicological properties of the materials are reviewed. Proper choice of materials of construction and materials in contact with the active gases are considered. The survey includes safe practices in design and operation of experiments and processes. Soda lime traps and caustic scrubbing are reviewed for fluorine disposal methods. Finally some explosive reactions and explosive situations are discussed. (ERA citation 04:048962)

LA-UR-79-1524 PC **A05**/MF **A01**
Los Alamos Scientific Lab., NM.
Multiple-Photon Excitation of Polyatomic Molecules in a Strong Optical Field: A Universal Normalization.
C. P. Robinson, and O. P. Judd. 1979, 93p
CONF-790690-1
Contract W-7405-ENG-36
International conference on laser spectroscopy, Rottach-Egern, Tegernsee, F.R. Germany, 11 Jun 1979.

The phenomenon of Multiple Photon Excitation (MPE) of polyatomic molecules by a (laser) optical field has proved to be quite general. We have been attempting for some time to relate the absorption response of a molecule to the optical driving force in terms of a general model which would take into account the important molecular parameters. A picture of the interaction has emerged which emphasizes the dynamics of absorption within a single vibrational manifold with rapid intramodal coupling to other vibrational modes. The similarity between this picture of the excitation process by an optical field and the de-excitation process for vibrational relaxation of polyatomics provided strong motivation to seek a universal curve for the MPE process by analogy to the Lambert–Salter correlation for relaxation processes. (ERA citation 04:050666)

LA-UR-79-2040 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Photonic Compression.
J. W. Shaner. 1979, 8p CONF-790709-9
Contract W-7405-ENG-36
VII international AIRAPT conference, La Creusot, France, 30 Jul 1979.

Lasers developed for fusion applications now have the capability of creating pressures in excess of 100 Mbar in the laboratory. The capability of these lasers for making high pressure equation of state measurements, progress toward that goal, and the problems which stand in the way are reviewed. (ERA citation 04:050667)

LBL-8042 PC **A13**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Some Double Resonance and Multiple Quantum NMR Studies in Solids.
D. E. Wemmer. Aug 78, 295p
Contract W-7405-ENG-48
Thesis.

The first section of this work presents the theory and experimental applications to analysis of molecular motion of chemical shielding lineshapes obtained with high resolution double resonance NMR techniques. Analysis of exp 13 C powder lineshapes in hexamethylbenzene (HMB) and decamethylferrocene (DMFe) show that these molecules reorient in a jumping manner about the symmetry axis. Analysis of proton chemical shielding lineshapes of residual protons in heavy ice (D sub 2 O) show that protons are exchanged among the tetrahedral positions of neighboring oxygen atoms, consistent with motion expected from defect migration. The second section describes the application of Fourier Transform Double Quantum NMR to measurement of chemical shielding of deuterium in powder samples. Studies of partially deuterated benzene and ferrocene give equal shielding anisotropies, delta sigma = -6.5 ppM. Theoretical predictions and experimental measurements of dipolar couplings between deuterons using FTDQ NMR are presented. Crystals of BaClO sub 3 .D sub 2 O, alpha , beta d-2 HMB and alpha , beta , gamma d-3 HMB were studied, as were powders of d-2 HMB and anisic acid. The third section discusses general multiple quantum spectroscopy in dipolar coupled spin systems. Theoretical description is made for creation and detection of coherences between states without quantum number selection rules delta m = +-1. Descriptions of techniques for partial selectivity of order in preparation and detection of multiple quantum coherences are made. The effects on selectivity and resolution of echo pulses during multiple quantum experiments are discussed. Experimental observation of coherences up to order 6 have been made in a sample of benzene dissolved in a liquid crystal. Experimental verifications of order selection and echo generation have been made. (ERA citation 04:047837)

LBL-8482 PC **A07**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.

Field 7—CHEMISTRY

Group 7D—Physical Chemistry

Infrared Absorption Spectroscopy of Carbon Monoxide on Nickel Films: A Low Temperature Thermal Detection Technique.
R. B. Bailey. Nov 78, 139p
Contract W-7405-ENG-48
Thesis.

Sensitive vibrational spectra of carbon monoxide molecules adsorbed on evaporated nickel films have been measured by attaching a thermometer to the sample, cooling the assembly to liquid helium temperatures, and recording the temperature changes which occur when infrared radiation is absorbed. The measurements are made in an ultrahigh vacuum chamber in which the sample surface can be cleaned, heated, exposed to gas molecules and cooled to 1.6 K for the infrared measurements. The spectra of chemisorbed CO molecules are interpreted in terms of the linear and bridge adsorption sites on the nickel surface, and they show how the distribution of molecules among these sites changes when the CO coverage increases and intermolecular forces become important. The spectra of physically adsorbed molecules in both monolayer and multilayer films are also reported. Absorptions as small as five parts in 10 exp 5 of the incident radiation can presently be detected in spectra covering broad bands of infrared frequencies with a resolution of 2 cm exp -1 . This high sensitivity is attributable to the low noise and reduced background signal of the thermal detection scheme, to the stability of the rapid scan Fourier transform infrared spectrometer, and to the automated computerized data acquisition electronics. Better performance is expected in future experiments on single crystal samples as well as evaporated films. This will make it possible to study molecules with weaker absorptions than CO and to look for evidence of chemical reactions between different adsorbed molecules. (ERA citation 04:046986)

LBL-8739 PC **A11**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Ultraviolet Spectroscopy of Nitrous Oxide (N Sub 2 O): a Temperature-Resolved Study.
G. S. Selwyn. Mar 79, 239p
Contract W-7405-ENG-48
Thesis.

The absorption spectra of nitrous oxide and its exp 15 N isotopes have been studied from 172 to 330 nm. The long wavelength absorption above 265 nm is shown to be almost entirely due to Rayleigh scattering. This reduces the calculated rate of nitrous oxide photolysis in the troposphere to a very small value. The temperature dependence of the absorption from 173 to 240 nm was measured for use in atmospheric modeling of the photolysis of nitrous oxide. Spectra over the wavelength range 172 to 190 nm demonstrate that the diffuse bands are a separate pronounced absorption of nitrous oxide which is strongly affected by temperature. This banding is the result of transitions to discrete vibronic levels in an upper electronic state. No rotational structure was observed. (ERA citation 04:047105)

LBL-9082 PC **A07**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Lifetime of the Metastable 2 exp 3 S sub 1 State in Stored Li exp + Ions.
R. D. Knight. Apr 79, 143p
Contract W-7405-ENG-48
Thesis.

A laser-induced fluorescence technique combined with the observation of spontaneous magnetic dipole photons from the highly metastable 2 exp 3 S sub 1 state of Li exp + was used to measure the radiative lifetime of this state. The ions are created by electron impact on a lithium atomic beam and are subsequently stored for periods of many seconds in an RF-quadrupole ion trap. A tunable dye laser excites the 2 exp 3 S--2 exp 3 P, transition at 5485A, and the intercombination electric dipole transition 2 exp 3 P sub 1 --1 exp 1 S sub 0 at 202A is observed. This process depletes the metastable population in a time tau/sub d/ < 1 sec < < tau/sub exp 3 S sub 1 / and provides a measure of the total number of metastables. Comparison with the rate of 210A spontaneously emitted photons yields a measured value for the 2 exp 3 S sub 1 radiative lifetime of tau/sub rad/ = 58.6 +- 12.9 sec, where the quoted error represents 95% confidence levels. The theoretical lifetime is tau/sub theory/ = 49.0 sec. The measured value includes data taken with both exp 6 Li exp + and exp 7 Li exp + isotopes and was corrected for the slightly different detector efficiencies at 202A and 210A. A careful study of nonradiative quenching of the metastable state was necessary to understand observed differences between tau/sub rad/ and tau/sub exp 3 S sub 1 /, the total metastable lifetime. Spatial density profiles of the ions within the trap, useful for determining the ion temperature, were obtained by scanning the laser beam horizontally across the ion trap while storing 2 exp 3 P sub 1 -- exp 1 S sub 0 photon counts as a function of the laser beam's position. Agreement with a simple equilibrium model, including space charge effects, is satisfactory. A study of the optical pumping process is necessary to understand the laser-ion interaction, and observational and theoretical data are presented. 47 references. (ERA citation 04:049320)

MIT-2793 PC **A05**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Chemistry.
Nonequilibrium Photochemical Reactions Induced by Lasers. Technical Progress Report.
J. I. Steinfeld. 15 Jan 79, 84p
Contract EY-76-S-02-2793

Infrared double resonance spectroscopy was carried out on SF sub 6 molecules excited with a CO sub 2 laser, using a tunable diode laser as the probe source. Power broadening induced by the pump beam, transitions in the nu sub 3 implies 2 nu sub 3 manifold, and relaxations within the nu sub 3 vibrational level brought about by collisions between SF sub 6 and other molecules of SF sub 6 , He, and CH sub 3 F were observed. Results indicate that rotational broadening of the excited-state absorption band envelopes may play a significant role in anharmonicity compensation, and that rotational relaxation proceeds mainly by collisions which reorient the angular momentum with respect to the internal coordinates of the SF sub 6 molecule, but leave the total J quantum number nearly unchanged. Progress is also reported in the study of reactions induced by multiple infrared photon excitation. The dehydrohalogenation of R sub 2 C = CHCl systems (R = H, CH sub 3 , F) has been examined for the vinyl carbene (R sub 2 C = C:) intermediate. Several theoretical aspects of the problem have been examined, including the effect of using various distribution functions in RRKM models of the multiphoton dissociation process, and an analysis of energy deposition in absorbing samples by focused Gaussian beams. (ERA citation 04:048975)

MLM-2627(OP) PC **A02**/MF **A01**
Dayton Univ., OH. Research Inst.
Surface Studies of an Aluminum/Cuprous Oxide Thermite Mixture by X-Ray Photoelectron and Auger Spectroscopies. I. Studies of Aluminum.
W. E. Moddeman, A. Rengan, P. S. Wang, and L. D. Haws. 1979, 20p CONF-790207-6
Contract EY-76-C-04-0053
10. symposium on explosives and pyrotechnics, San Francisco, CA, USA, 14 Feb 1979.

Thermite is a name given to a mixture of powdered metal and a metallic oxide. The thermite under examination was a powdered mixture of aluminum metal and cuprous oxide in a mole ratio of 2:3. The surface chemistries of the powdered aluminum and the thermite mixture were examined by the surface analysis techniques of x-ray photoelectron spectroscopy (XPS) and high resolution Auger electron spectroscopy (AES). Surface characterization with XPS and AES found the presence of carbon and aluminum oxide on the aluminum reactant and mixtures. A surface oxide thickness of 9.8 A was measured for room temperature stored powdered aluminum metal. The aluminum oxide thickness on the aluminum powder was noted to be larger for room temperature aged thermite powder (10.5 A) and a thermite pressed pellet (22 A). All oxide thicknesses were found to be larger when aged in dry air or argon at an elevated temperature of 180 exp 0 C. The largest oxide thickness measured was 26 A. Carbon contaminant levels were measured and were found to decrease from 64 A for room temperature stored metal to 34 A for metal stored at 180 exp 0 C. (ERA citation 04:048966)

N80-10687/5 PC **A05**/MF **A01**
Delaware Univ., Newark. Coll. of Marine Studies.
The Use of Satellites in Environmental Monitoring of Coastal Waters.
Final Report.
W. Philpot, and V. Klemas. 20 Sep 79, 79p
NASA-CR-162409
Grant NSG-1433

The feasibility of using satellites in an operational system for monitoring the type, concentration, location, drift, and dispersion of pollutants in coastal waters is evaluated. Visible, microwave, and thermal infrared sensing are considered. Targets to be detected include photosynthetic pigments, iron acid waste, and sewage sludge.

N80-10711/3 PC **A03**/MF **A01**
Old Dominion Univ. Research Foundation, Norfolk, Va.
Evaluation of Atmospheric Trace Constituent Sensors Operating from Remote Space and Airborne Platforms.
Final Report, period ending 13 Jun. 1979.
E. Condon, and E. C. Kindle. Oct 79, 29p NASA-CR-162365, GSTR-79-8
Grant NSG-1394

A laboratory gas analysis system was developed specifically to make trace level measurements of carbon monoxide. To assure that the data collected with this system are correctly aligned with other established methods for making these measurements, an intercalibration study was conducted. The calibration gas was analyzed by the various participating laboratories and found to contain 1.28 ppm CO. Samples were collected at 25 deg, 35 deg, and 45 deg N for profile data to study the variation in concentrations of CO and CH4 as a function of altitude and latitude in continental air over the eastern seaboard of the United States. The experiment was repeated several months later to determine if there were seasonally dependent variations in the CO and CH4 concentrations.

N80-10866/5 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Washington, D. C.
Elements of the Theory of Molecular Spectra.
L. A. Gribov. Oct 79, 44p NASA-TM-75686, PR-461
Contract NASW-3198
Tran-Transl. Into English of "Elementy Teorit Molekulyarnykh Spectrov", Rept. Pr-461 Acad. Of Sci. Ussr, Inst. Of Space Res., Moscow, 1979 p 1-42. Misc-Original Language Document Was Announced as A78-15221. Subm-Transl. By Scientific Translation Service, Santa Barbara, Calif.

The basic aspects of the theory concerning the spectra of multiatomic molecules are presented. The classification of the forms of motions in a molecule, the methods for determining the corresponding Schroudinger levels, the spectral types and the selection rules are discussed in order to identify their presence and state in outer space.

ORO-5126-66 PC **A02**/MF **A01**
Maryland Univ., College Park. Dept. of Physics and Astronomy.
Quantized Gauge Invariant Periodic TDHF Solutions.
K. K. Kan, J. J. Griffin, P. C. Lichtner, and M. Dworzecka. Apr 79, 11p
Contract EY-76-S-05-5126

The time-dependent Hartree-Fock method (TDHF) is used to study steady state large-amplitude collective motions, such as vibration and rotation. The central aspect explored is the periodicity. By a close analogy with the exact Schroedinger eigenstates, a subset of periodic TDHF solutions, the gauge invariant periodic solutions are considered. The TDHF supports a continuous family of periodic solutions, but only a discrete subset of these is gauge invariant. Also it is proven that these discrete gauge invariant periodic solutions obey the Bohr--Summerfeld quantization rule. The energy spectrum of the gauge invariant periodic solutions is compared with the exact eigenenergies in one specific example. The study implies that the gauge invariant periodic TDHF solutions are a very promising approximate description of the exact Schroedinger eigenstates. 10 references. (ERA citation 04:049365)

PATENT-4 169 882 Not available NTIS
Tennessee Valley Authority, Muscle Shoals, AL.
Purification of Phosphoric Acid with Oxalic Acid.
Patent,
Richard C. Sheridan. Filed 13 Nov 78, patented 2 Oct 79, 6p PB80-111701, PAT-APPL-959 979
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Impure wet-process phosphoric acid is treated with urea by known processes to produce relatively pure urea phosphate which is then treated with oxalic acid to give solid urea oxalate and purified phosphoric acid product. The urea oxalate is either treated with ammonia to give urea and ammonium oxalate or it is pyrolyzed to produce urea and oxamide.

PB80-102379 PC **A06**/MF **A01**
Southern Research Inst., Birmingham, AL.
A Technique for Predicting Fly Ash Resistivity.
Final rept. Nov 75-May 79,
Roy E. Bickelhaupt. Aug 79, 115p EPA/600/7-79/204
Contract EPA-68-02-2114

The report gives results of research to develop a technique for predicting: the electrical resistivity of fly ash from as-received, ultimate coal analysis; and the chemical composition of the concomitant coal ash produced by simple laboratory ignition. Important chemical factors are the alkali metals, alkaline earths, and iron (with respect to the fly ash), and the water and sulfur trioxide concentrations in the flue gas. Many fly ash samples were evaluated to minimize variations due to physical effects. The effects of fly ash chemical composition, ash layer field strength, and the water and sulfur trioxide concentrations in the test environment were evaluated with respect to electrical resistivity and the evaluated parameters for the entire temperature spectrum of interest. Equipment and techniques were developed to obtain the required data. Predicted sensitivity as a function of temperature was favorably proof-tested using data acquired from previous field evaluations of precipitators at six power generating stations. The proof test involved a comparison of predicted resistivity, laboratory measured resistivity, resistivity measured in situ, precipitator efficiency, and current density of the precipitator outlet fields.

PB80-103674 PC **A05**/MF **A01**
National Bureau of Standards, Washington, DC.
Journal of Research of the National Bureau of Standards. Volume 84, Number 5, September-October 1979.
Bi-monthly rept.
1979, 95p
See also Volume 84, Number 2, PB-296 439.

Contents:
A high precision load cell mass comparator;
Molecular interpretations of modulus and swelling relations in natural rubber cross-linked by dicumyl peroxide;
Theory of flow-induced fibril formation in polymer solutions;
Observations of surface changes in platinum crucibles;
Isoionic isotope exchange with hydroxylapatite and the dilution effect.

PB80-104094 PC **A03**/MF **A01**
Maryland Univ., College Park.
Research Needs and Instrumental Requirements in Catalysis.
Jun 78, 45p NSF/RA-780663
Grant NSF-ENG78-10108
Proceedings of a Workshop Held at College Park, Maryland on June 22-23, 1978.

This workshop evaluates the art and science of heterogeneous catalysis and formulates recommendations for fundamental research. Rapid recent developments in spectroscopic techniques for studying catalysis constitute the basis for constructing a new discipline to investigate fundamental processes of heterogeneous catalysis. This development will meet the sharply increased needs for catalytic processes involved in developing new energy sources, in efficient use of dwindling raw materials, and in environmental protection. Strong support of fundamental catalytic research is recommended in the following areas: (1) techniques to characterize catalysis under industrially realistic conditions; (2) characterizations of catalysts similar to those used in industry but under experimental conditions optimally adapted to the measurements performed; and (3) acquisition of detailed knowledge of fundamental processes in catalysis. Catalysis by metals and nonmetals and the applications of spectroscopy to catalysis are discussed. No concensus was reached concerning establishment of research centers for catalysis.

PB80-104193 Not available NTIS
National Bureau of Standards, Washington, DC.
Comparison of Dielectric and Refractive Virial Coefficients and Collision Induced Absorption Bands.
Final rept.,
G. Birnbaum, and T. K. Bose. 1 Jul 79, 3p
Sponsored in part by Ministry of Education, Quebec (Canada), and National Research Council of Canada, Ottawa (Ontario).
Pub. in Jnl. of Chemical Physics 71, n1, p17-19, 1 Jul 79.

The second dielectric virial coefficient minus the second refractive virial coefficient is equal to the Kramers-Kroning contributions arising from the far-infrared and infrared pressure induced absorption bands due to bimolecular interactions. The usefulness in comparing such results is illustrated for CO2, C2H4, CH4, and SF6. It is shown that for SF6 there may be as yet unmeasured collision induced bands and for C2H4 the far-infrared collision induced absorption is anomalously large.

PB80-104201 Not available NTIS
National Bureau of Standards, Washington, DC.
Discussion on the Paper Ionic Conductivity of Some Lithium Silicates and Aluminosilicates by I. D. Raistrick, C. Ho, and R. A. Huggins.
Final rept.,
A. D. Franklin, and K. F. Young. Jun 77, 2p
Pub. in Jnl. of the Electrochemical Society 124, n6, p871-872, Jun 77.

It is shown that the impedance data of Raistrick et. al. (J. Electrochem. Soc. 123, 1469, 1976) can be well represented by an equivalent circuit in which grain boundary effects are represented by a modified Cole-Cole distribution of impedance, and electrode effects by a similar distribution of admittance. Physical models are discussed.

PB80-104276 Not available NTIS
National Bureau of Standards, Washington, DC.
Economics of Hydrogen.
Final rept.,
J. Hord, and W. R. Parrish. 1979, 46p
Pub. in Hydrogen: Its Technology and Implications, n5, Chapter 1, p3-48 1979.

The costs of producing, transmitting, and storing hydrogen are presented in this chapter. Production methods considered are steam-reformation and partial oxidation of methane, coal gasification, partial oxidation of fuel oil, water electrolysis, and hybrid thermochemical-electrolysis. The costs of compressing, liquefying, slushing, and solidifying hydrogen gas are also outlined. Modes of hydrogen transmission considered are overland and underwater gas pipelines, overland liquid pipelines, compressed gas or liquid by highway, railway, or sea, and metal hydrides by highway or railway. Hydrogen storage options considered are underground caverns for compressed gas, low pressure gas holders, metal hydride, high pressure compressed gas in steel cylinders, and dewars for liquid. Potential by-product cost credits are reviewed and examples of hydrogen-system cost analyses are given.

PB80-104284 Not available NTIS
National Bureau of Standards, Washington, DC.
Field-Induced Redistribution Processes in Adsorption Layers of Hydrogen on Ruthenium.
Final rept.,
G. Greiner, D. Menzel, and R. Klein. 1979, 12p
Pub. in Surface Science 84, p129-140 1979.

The field-induced effects in hydrogen layers on ruthenium field emitters, which had been observed before, have been investigated in more detail in two laboratories. Raising the field causes an increase of emission, due to a decrease of work function, on certain planes and vicinals (mostly on and around the (110)) of the Ru field emitter. The extent and rate of appearance of this effect depends on field, coverage and temperature. It is shown that the cause is mainly the disappearance of hydrogen from these areas, which is probably due to a field-induced decrease of the adsorption energy on these areas relative to others. Possible mechanisms are discussed.

PB80-104441 Not available NTIS
National Bureau of Standards, Washington, DC.
An Analysis of the B(1)Ii(u)-X(1)sigma(+)g Band System of Na2.
Final rept.,
P. Kusch, and M. M. Hessel. 15 Mar 78, 16p
Sponsored in part by Air Force Office of Scientific Research, Arlington, VA.
Pub. in Jnl. of Chemical Physics 68, n6, p2591-2606, 15 Mar 78.

A critical analysis of the B 1 Pi(u) - X 1 Sigma(g)(+) band system of the Na2 molecule has been made. The body of data on which the present analysis is based is much more extensive than that used in any previous analysis. The data for the analysis were obtained by a laser-induced fluorescence technique in which many collisionally induced satellite fluorescence series were observed in addition to the directly excited series.

PB80-104482 Not available NTIS
National Bureau of Standards, Washington, DC.
Chain Deformations in Rubber.
Final rept.,
J. A. Hinkley, C. C. Han, B. Mozer, and H. Yu. 1978, 3p
Pub. in Macromolecules 11, n4, p836-838 1978.

Small angle neutron scattering measurements were performed on mixtures of poly-(butadiene-d6) at 3% or less in polybutadiene and on uniform networks containing 3% deuterated chains over the range of extension ratios 1 = or < lambda = or < 1.55. The chain dimensions of poly(butadiene-d6) in the mixtures and in the unstrained networks (lambda=1) are found to be the same within the experimental uncertainty. The increase of the chain dimension with extension ratio is in qualitative accord with that predicted for the affine deformation of crosslink junctions.

PB80-104490 Not available NTIS
National Bureau of Standards, Washington, DC.
Transport Properties of a Binary Mixture at the Gas-Liquid Critical Point.
Final rept.,
B. J. Ackerson, and H. J. M. Hanley. 1978, 1p
Pub. in Am. Phys. Soc. Bull. 23, p315 1978.

Experimental Rayleigh light scattering measurements were made on a 70% (molar) methane-30% ethane mixture close to the gas-liquid critical point. The rate of decay for both concentration and entropy fluctuations were determined together with the critical temperature, critical pressure, and the dielectric constant. The decay rate of the concentration fluctuations showed anomalous behavior similar to that found at a consolute point, as expected. The decay rate of the entropy fluctuations, however, appeared well-behaved or, at most, weakly anomalous. A one-fluid model was used to estimate quantitatively the decay rate (thermal diffusivity) for the entropy fluctuations. Agreement between theory and experiment is excellent.

PB80-104656 PC **A06**/MF **A01**
Research Triangle Inst., Research Triangle Park, NC.
Pollutants from Synthetic Fuels Production: Sampling and Analysis Methods for Coal Gasification.
Final rept. Aug 78-Jul 79,
S. K. Gangwal, P. M. Grohse, D. E. Wagoner, D. J. Minick, and C. M. Sparacino. Aug 79, 102p EPA/600/7-79/201
Grant EPA-R-804979
See also PB-287 730.

The report describes sampling and analysis methods involving a laboratory-scale coal gasification

facility used to study the generation, sampling, chemical analysis, process evaluation, and environmental assessment of pollutants from coal gasification. It describes methods for particulates, organic condensibles, and vapors or gases in the raw product stream of the gasifier as well as for solid residues. It describes gas chromatography (GC) procedures for measuring fixed gases, Cl-C5 hydrocarbons, sulfur gases, and C6-C8 aromatics. Atomic adsorption (AA) procedures for measuring toxic trace elements include those for arsenic, selenium, lead, cadmium, chromium, and mercury. Volatile organics are collected from the gas stream using polymeric sorbents (Tenax GC and XAD-2), and analyzed by glass capillary GC/mass spectrometry (MS). The major nonvolatile byproduct (tar) is prefractionated by solvent partitioning into acid, base, and neutral fractions. Each fraction is analyzed by capillary GC/MS or high-performance liquid chromatography (HPLC). Typical results are given to illustrate the nature of the compounds studied, the methodologies, and their sensitivities.

PB80-105323 PC **A02**/MF **A01**
Purdue Univ., Lafayette, IN.
Enzyme Catalyzed Synthesis Reactions in Non-Aqueous Solvents by Reversal of Nominally Hydrolytic Reactions.
Progress rept.,
Larry G. Butler, and Robert G. Squires. 20 Nov 75, 24p NSF/RA/T-75/120
Grant NSF-GI-37903
See also PB-273 040.

Experiments designed to produce sucrose from mixtures of glucose and fructose by reversal of the sucrose invertase reaction are reported. The hypothesis underlying this reaction is based on the concept that the thermodynamic equilibrium of hydrolytic reactions can be shifted by decreasing the water concentration so as to favor synthesis rather than hydrolysis. The effects of non-aqueous solvents on invertase stability were studied together with the influences of a large number of variables (temperature, substrate composition, water concentration, nature of the non-aqueous component of the solvent and source of enzyme) on the invertase catalyzed production of sugars other than glucose and fructose. The experimental procedure involved preparing equimolar reaction mixtures of glucose and fructose, and in separate samples, the equivalent concentration of sucrose. Paper chromatography was used to identify tentative reaction components at various time intervals. Four strains of Aspergillus served as sources of the invertase enzymes. Results showed that the material produced from glucose and fructose is not sucrose. The materials formed have not been identified but appear to be between glucose and sucrose. Possible explanations of this phenomenon together with suggestions for future research are outlined.

SAN-0034-T1 PC **A02**/MF **A01**
California Univ., Davis. Crocker Nuclear Lab.
Nuclear Methods in Chemical Kinetics. Technical Progress Report, April 1, 1978--March 31, 1979.
1979, 25p
Contract EY-76-S-03-0034-217

The 1978--1979 DOE research proposal included the following projects: (i) gas phase thermal F-to-HF reactions; (ii) gas phase thermal exp 18 F olefinic addition reactions; (iii) steady state hot atom kinetic theory; (iv) moderator effects on nuclear recoil exp 18 F substitution reactions; and (v) new experimental methodology. As detailed below, significant progress has been achieved in all of these areas. In addition, new work has been initiated upon the development of a realistic potential form of kinetic collision theory. (ERA citation 04:052062)

SAND-79-0791C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Electron Spectroscopic Investigations of the Oxidation of Beryllium.
H. H. Madden, and D. M. Zehner. 1979, 7p CONF-7906113-1, CONF-7906114-1
Contracts W-7405-ENG-26, EY-76-C-04-07
Conference on surface studies, Golden, CO, USA, 26 Jun 1979.

Measurements were made on clean and oxidized Be surfaces to investigate the changes in electronic structure of the Be surface upon oxidation. (ERA citation 04:051947)

UCRL-Trans-1572 PC **A02**/MF **A01**
Comments on the Derivation of the Carnot Efficiency According to Max Planck: Thermodynamics (Eleventh Edition) De Gruyter 1964; and R. Clausius: Mechanical Heat Theory (Third Edition) Vieweg 1887.
J. Kirchhoff. May 79, 24p
Contract W-7405-ENG-48
A an unpublished German paper, 1979.

No abstract available.

UCRL-15100 PC **A04**/MF **A01**
Pittsburgh Univ., PA. Dept. of Physics and Astronomy.
Compton Scattering.
D. J. Botto, and R. H. Pratt. May 79, 54p
Contract W-7405-ENG-48

The current status of Compton scattering, both experimental observations and the theoretical predictions, is examined. Classes of experiments are distinguished and the results obtained are summarized. The validity of the incoherent scattering function approximation and the impulse approximation is discussed. These simple theoretical approaches are compared with predictions of the nonrelativistic dipole formula of Gavrila and with the relativistic results of Whittingham. It is noted that the A exp -2 based approximations fail to predict resonances and an infrared divergence, both of which have been observed. It appears that at present the various available theoretical approaches differ significantly in their predictions and that further and more systematic work is required. (ERA citation 04:050668)

UCRL-82126 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Electrical Conductivity of Shocked Water and Ammonia.
A. C. Mitchell, M. I. Kovel, W. J. Nellis, and R. N. Keeler. 23 Jul 79, 5p CONF-790709-7
Contract W-7405-ENG-48
VII international AIRAPT conference, La Creusot, France, 30 Jul 1979.

The electrical conductivity of shocked H sub 2 O was measured between 30 to 60 GPa and the conductivity of shocked NH sub 3 to 28 GPa. (ERA citation 04:050377)

UCRL-82129 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
High-Pressure and High-Temperature Behavior of Simple and Complex Molecular Liquids.
F. H. Ree, and M. Ross. 19 Jul 79, 8p CONF-790709-11
Contract W-7405-ENG-48
VII international AIRAPT conference, La Creusot, France, 30 Jul 1979.

Recent theories in statistical mechanics and intermolecular forces are used to explain the shock-wave data of inert gases, diatomic molecules, and hydrocarbons. (ERA citation 04:050670)

UCRL-82889 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Formation of Hydrogen Negative Ions by Surface and Volume Processes with Application to Negative Ion Sources.
J. R. Hiskes. 27 Jun 79, 21p CONF-790708-3
Contract W-7405-ENG-48
XIV conference internationale sur les phenomenes d'ionisation dans les gaz, Grenoble, France, 9 Jul 1979.

During the last few decades interest in negative-hydrogen ion sources has been directed mainly toward synchrotron and other particle accelerator applications, with emphasis on high current densities delivered for short pulses. But within the last several years there has been an awareness in the magnetic fusion program of the future need for negative ions as a means for generating high energy neutral beams, beams with energies above a few hundred keV. Negative ions seem to be the only effective intermediary for efficiently producing such beams. Although methods for generating negative ion beams have relied upon synchrotron concepts, the requirements for fusion are very different: here one is interested in more moderate current densities, up to 100 m A cm exp -2 , but with continuous operation. Proposed source modules would accelerate of the order of 10 A of beam current and deliver several megawatts of beam power. Both H exp - and D exp - beams are being considered for application in different reactor systems. The conceptualization of negative ion sources is now in a very volatile stage. But of the great variety of proposals that have been offered to date, three general areas appear ready for development. These are: first, the double charge exchange method for converting a positive ion beam into a negative ion beam; second, electron-volume processes wherein low energy electrons interacting with molecular species lead to negative ion products via dissociative attachment or recombination; and third, generation of negative ions in surface interactions, principally via desorption and backscattering. Both our qualitative and our quantitative understanding of these processes diminishes as one proceeds from the first through the third. The physics of these three methods is considered in detail. (ERA citation 04:049315)

UT/CES-ES-4 PC **A07**/MF **A01**
Texas Univ. at Austin. Center for Energy Studies.
Automatic Instrumentation for Monitoring Ambient Air Quality Near Power Plants.
V. F. Gea, and H. B. H. Cooper, Jr. Jun 78, 134p

The main instrumentation commercially available for continuous automatic determination of ambient air quality levels of the most important gaseous and particulate pollutants is extensively discussed. The discussion is organized in accordance with specific pollutants, emphasizing the principles of operation, performance, function, and operating features in order to provide a useful criterion for adequately selecting an instrument and to efficiently accomplish this task. The advantages and disadvantages of the instrument in question are stressed and comparative remarks are made. Many different detection principles are available for monitoring a specific pollutant and this presents a formidable challenge to the user, unless the monitoring objectives are clearly defined, and the operating features, functions, and performance capability requirements of the instrumentation under considertion are well known. (ERA citation 04:031391)

Y/DK-225 PC **A02**/MF **A01**
Oak Ridge Y-12 Plant, TN.
Analysis for Polychlorinated Biphenyls in Environmental Samples.
T. T. Adams, N. J. Williams, R. J. McElhaney, and R. A. Viator. Jun 79, 18p
Contract W-7405-ENG-26

Polychlorinated biphenyls (PCB's) have been found to be widely distributed and very persistent in the environment. The various techniques used by the Y-12 Plant Laboratory for the analysis of PCB's are described. (ERA citation 04:050401)

7E. Radio and Radiation Chemistry

AED-Conf-78-274-009 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation Eggenstein-Leopoldshafen (Germany, F.R.).
Studies on the Radiation Initiated Home and Copolymerization in Inclusion Compounds.
C. Schneider, and H. P. Bohlmann. 1978, 1p CONF-7810177-2
In German.Lecture meeting on principles and applications of nuclear-, radio-, and radiation chemistry, Lindau, F.R. Germany, 16 Oct 1978.
U.S. Sales Only.

No abstract available.

CALT-63-304 PC **A03**/MF **A01**
California Inst. of Tech., Pasadena.
Capture of Muons in Atoms.
P. Vogel. 1978, 34p CONF-7804144-1
Contract EY-76-C-03-0063
Nordic spring symposium on inner shell phenomena, Geilo, Norway, 17 Apr 1978.

A lecture is given on the general theoretical framework developed for the description of the formation of mesic atom and the initial part of the atomic cascade. Some of the observable phenomena are also discussed. 16 references. (ERA citation 04:049322)

COO-1167-41 PC **A02**/MF **A01**
Chicago Univ., IL. Enrico Fermi Inst.
Annual Progress Report on Nuclear Chemistry Research, February 1, 1979—January 31, 1980.
A. Turkevich. 15 Jan 79, 18p
Contract EY-76-S-02-1167

The principal effort during this contract period was directed toward preparing for on-line radiochemical experiments at LAMPF directed toward studying rare processes such as (pi exp - , pi exp +), (n, delta exp + +) and (mu exp - , e exp +) in exp 88 Sr. Chemical scavenging techniques to remove interfering products were shown to be effective without significantly affecting the sensitivity of the detection system. Sensitivities of less than 0.1 mu b for the first two processes appear achievable. Detailed statistical analysis of last years' experiments is leading to new limits, about an order of magnitude lower than already reported, on the formation of polyneutrons, reinforcing the conclusion that such species are not particle stable. 100 exp - GeV pi exp - studies of copper spallation are revealing no dramatic differences between spallation with pions and that with protons. Essentially, this report consists of a collection of abstract-like summaries. (ERA citation 04:048977)

COO-3221-60 PC **A03**/MF **A01**
Hebrew Univ., Jerusalem (Israel). Dept. of Physical Chemistry.
Nature of Oxygen Containing Radicals in Radiation Chemistry and Photochemistry of Aqueous Solutions. Annual Progress Report, September 1978--July 1979.
G. Czapski. 1979, 42p
Contract EY-76-C-02-3221

The proposed research is a continuation of the work conducted under this contract and is outlined. During this year, the main emphasis will be given to study further the properties of HO sub 2 and O sub 2- and OH, mainly in their role in biological systems. We will continue to study and elucidate how O sub 2- reacts in biological systems. The toxicity of O sub 2- is quite well established, but the mechanism is still obscure. The Haber Weiss reaction most probably can not account for the toxicity of O sub 2- nor for the formation of singlet oxygen, nor of OH. We will study if reduction of Fe exp 3+ complexes by O sub 2- in biological systems does catalyze the Haber Weiss reaction and if OH is formed in this mechanism. The role of oxygen, radiosensitizers in radiation damage of bacteriophages and cells will be further studied, as well as on E. Coli and Enzymes. We will try to elucidate the formation and role of OH, O sub 2- and O sub 2 in these systems as well as the relative contribution of endogenous and exogenous damage, and the role of direct and indirect radiation damage to cells. We intend also to study if SOD (super oxide dismutase) does react only with O sub 2- or also with biological peroxides (RO sub 2) and Hydroperoxides (RO sub 2 H). Further studies of O sub 2- and O sub 2 with various cytochromes, and hemoglobins is planned. (ERA citation 04:053513)

CRN-CNPA-77-23 PC **A10**/MF **A01**
Strasbourg-1 Univ. (France). Centre de Recherches Nucleaires.
Search for the Experimental Conditions of the Solvent Extraction of Sodium, Potassium and Cesium Cryptates for a Possible Application to Analytical Radiochemistry.
M. Jimenez Reyes. 1977, 212p
In French.Thesis.
U.S. Sales Only.

The experimental conditions of the solvent extraction of the Na exp + , K exp + and Cs exp + cations have been studied in correlation with the parameters that rule the chemical equilibre in the system: nature and concentration of the ligand (cryptand), concentrations of the base and of the suited electrolyte, time of shaking. The conclusions point to a possible application to the analytical chemistry of the alkaline ions. (Atomindex citation 10:447922)

FRNC-TH-767 PC **A10**/MF **A01**
Toulouse-3 Univ. (France).
Study of Liquid Hydrocarbons Subjected to Ionizing Radiations.
R. Grob. 1977, 218p
In French.These (D. es S.).
U.S. Sales Only.

This work is a study of liquid hydrocarbons (especially alkanes and cycloalkanes), ionized and excited by low L.E.T. high energy radiation. An analysis of radiolytical products shows a definite correlation between radiochemical yields and bond energies. The study of the influence of scavengers has been carried out and the methods for the determination of alpha parameters are discussed. Ionic recombination has been fully investigated: theoretical studies, based on a phenomenological model, on primary and (in presence of solute) secondary charge recombination have been performed. Secondary species were observed by use of kinetic optical absorption spectrophotometry. A good agreement with theory is obtained only when the electron scavenging before thermalization is negligible. Electron mobility in hydrocarbons has been measured and the electron scavenging rate constants have been determined using the pulse conductivity technique. Conformational analysis calculations show a correlation between the electron mobility and the electronic structure. The rate of formation of a radiolytic product and the rate of decay of its precursor have been studied for solutions of hydrocarbons and electron scavengers. (Atomindex citation 10:458190)

LA-tr-79-27 PC **A02**/MF **A01**
Quantum Chemistry: Concerning the Excited States Occurring in the Photochemical Reactions of alpha -Pyrone, gamma -Pyrone, Coumarin, and Chromone.
H. Bouanini, and J. Gayoso. 1973, 12p
Contract W-7405-ENG-36
A , C. R. Hebd. Seances Acad. Sci., Ser. C, 276 P399-402 1973.

The pi electron structures are discussed. The photochemical reaction mechanisms are studied. Results confirm the hypothesis that the photochemically active states are the pi pi * excited states. (ERA citation 04:055332)

8. EARTH SCIENCES AND OCEANOGRAPHY

8A. Biological Oceanography

AD-A076 206/2 PC **A02**/MF **A01**
Naval Ocean Systems Center San Diego Ca
Thermal-Noise Limit in Delphinid Hearing.
Interim rept. Jan 78-Apr 79,
C. S. Johnson. Jun 79, 7p Rept no. NOSC-TD-270

In quiet experimental tanks, thermal noise is the dominant noise source above 50 kHz. Evidence indicates that in the frequency range above 50 kHz cetacean auditory thresholds are limited by thermal noise. Data were compared for Tursiops, Phocoena, Inia, and Delphinaptera.

LBL-9053 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Zooplankton from OTEC Sites in the Gulf of Mexico and the Caribbean.
M. L. Commins, and A. J. Horne. Jun 79, 5p
CONF-790631-9
Contract W-7405-ENG-48
OTEC conference, Washington, DC, USA, 19 Jun 1979.

The spatial and temporal variations in the abundance of major classes of zooplankton were measured using standard methods, between June and October 1978, at two OTEC sites in the Gulf of Mexico and in the Caribbean near Puerto Rico. The usual oceanic patterns were found with highest numbers near the surface, especially at night, and lowest numbers at 800 to 1000 m. Absolute numbers varied considerably from site to site. As expected, copepods (usually divided between calanoids and cyclopoids) dominated the zooplankton at all sites. (ERA citation 04:049685)

PB80-117963 Not available NTIS
California Univ., Bodega Bay. Bodega Marine Lab.
Population Cycles Caused by Inter-age, Density-dependent Mortality in Young Fish and Crustaceans,
Louis W. Botsford, and Daniel E. Wickham. 1979, 13p NOAA-79101510
Grant NOAA-04-6-158-44110
Pub. in Cyclic Phenomena in Marine Plants and Animals, p73-82 1979.

Cyclic fluctuations that occur in marine fish and crustacean populations can result from the influence of older individuals on mortality in young. New, multiple-age-class population stability results include characteristics that specific biological mechanisms must possess in order to cause cyclic fluctuations. Field measurements can be used in conjunction with these results to determine whether or not a specific phenomenon is the cause of observed cycles. Key parameters are the rate of change of density-dependent survival with effective population size and the relative effect of individuals of each age on density-dependent survival in young. Preliminary results of field studies on potential causal mechanisms of cyclic behavior in the northern Calif. Dungeness crab population are presented. Of the mechanisms under consideration, cannibalism and an egg-predator nemertean worm specific to the Dungeness crab, the former is currently the most likely cause. The general implications of theoretical results on cyclic behavior of other marine species, the possibility of a cycling population declining to a new low equilibrium level and some implications of cyclic behavior for fishery management are discussed.

8B. Cartography

AD-A075 895/3 MF **A01**
Center for Naval Analyses Alexandria Va Naval Warfare Analysis Group
The GLOBALL Computer Program and GLOBEMAP. A Special Purpose Three-Dimensional Plotter Subroutine,
Lewis W. Linton. Jul 74, 48p Rept no. CRC-266
Contract N00014-68-A-0091
Availability: Microfiche copies only.

GLOBALL manipulates several smaller computer programs to calculate global ranges and surface areas. GLOBEMAP provides a three-dimensional map background upon which the ranges and areas may be presented. This paper is not intended to be a user's manual but to describe characteristics of these models and possible applications of them. (Author)

AD-A076 104/9 PC **A04**/MF **A01**
Synectics Corp Rome N Y
Automated Air Information Production System. Phase I. Volume I. Executive Summary.
Final technical rept. 26 Apr 77-26 Jul 78,
N. Bottini , and P. Nash. Sep 79, 63p RADC-TR-79-179-VOL-1
Contract F30602-77-C-0065
See also Volume 2, AD-A076 105.

This report details developmental efforts in providing the initial phase of a fully automated Air Information Production System (AAIPS) for the Defense Mapping Agency Aerospace Center. The system is used to produce DOD Flight Information Publications (FLIPS); Navigation/Planning and Special Purpose Charts; Special Products; and the Automated Air Facility Information File. The requirements, functional design and operational considerations of the AAIPS Charting, Air Facilities, and Publishing Subsystems are presented. The principal purpose of the three subsystems is the reduction of the labor (manual) required for the revision and publication of information critical to flight operations and logistical planning. Improvement of response time between receipt of changes to air navigation/air facilities data and the dissemination of new data to all users, is also provided.

AD-A076 105/6 PC **A07**/MF **A01**
Synectics Corp Rome N Y
Automated Air Information Production System. Phase I. Volume II. Publishing Subsystem.
Final technical rept. 26 Apr 77-26 Jul 78,
S. Edelblum , and S. Bowden. Sep 79, 145p
RADC-TR-79-179-VOL-2
Contract F30602-77-C-0065
See also Volume 3, AD-A076 106.

Group 8B—Cartography

This report details developmental efforts in providing the initial phase of a fully automated Air Information Production System (AAIPS) for the Defense Mapping Agency Aerospace Center. The system is used to produce DOD Flight Information Publications (FLIPS); Navigation/Planning and Special Purpose Charts; Special Products; and the Automated Air Facility Information File. The requirements, functional design and operational considerations of the AAIPS Charting, Air Facilities, and Publishing Subsystems are presented. The principal purpose of the three subsystems is the reduction of the labor (manual) required for the revision and publication of information critical to flight operations and logistical planning. Improvement of response time between receipt of changes to air navigation/air facilities data and the dissemination of new data to all users, is also provided.

AD-A076 106/4 PC **A07**/MF **A01**
Synectics Corp Rome N Y
Automated Air Information Production System. Phase I. Volume III. Air Facilities Subsystem.
Final technical rept. 26 Apr 77-26 Jul 78,
W. Nehl , and P. Moulder. Sep 79, 135p RADC-TR-79-179-VOL-3
Contract F30602-77-C-0065
See also Volume 4, AD-A076 107.

This report details developmental efforts in providing the initial phase of a fully automated Air Information Production System (AAIPS) for the Defense Mapping Agency Aerospace Center. The system is used to produce DOD Flight Information publications (FLIPS); Navigation Planning and Special Purpose Charts; Special Products; and the Automated Air Facility Information File. The requiremetns, functional design and operational considerations of the AAIPS Charting, Air Facilities, and Publishing Subsystems are presented. The principal purpose of the three subsystems is the reduction of the labor (manual) required for the revision and publication of information critical to flight operations and logistical planning.

AD-A076 107/2 PC **A03**/MF **A01**
Synectics Corp Rome N Y
Automated Air Information Production System. Phase I. Volume IV. Charting Subsystem.
Final technical rept. 26 Apr 77-26 Jul 78,
J. Late , and A. DiPasqua. Sep 79, 45p RADC-TR-79-179-VOL-4
Contract F30602-77-C-0065
See also Volume 5, AD-A076 108.

This report details developmental efforts in providing the initial phase of a fully automated Air Information Production System (AAIPS) for the Defense Mapping Agency Aerospace Center. The system is used to produce DOD Flight Information Publications (FLIPS); Navigation/Planning and Special Purpose Charts; Special Products; and the Automated Air Facility Information File. The requirements, functional design and operational considerations of the AAIPS Charting, Air Facilities, and Publishing Subsystems are presented.

AD-A076 108/0 PC **A03**/MF **A01**
Synectics Corp Rome N Y
Automated Air Information Production System. Phase I. Volume V. Cartographic EBR System.
Final technical rept. 26 Apr 77-26 Jul 78.
Sep 79, 39p RADC-TR-79-179-VOL-5
Contract F30602-77-C-0065
Prepared in cooperation with Image Graphics, Inc., Fairfield, CT. See also Volume 1, AD-A076 104.

This report details developmental efforts in providing the initial phase of a fully automated Air Information Production System (AAIPS) for the Defense Mapping Agency Aerospace Center. The system is used to produce DOD Flight Information Publications (FLIPS); Navigation/Planning and Special Purpose Charts; Special Products; and the Automated Air Facility Information File. The requirements, functional design and operational considerations of the AAIPS Charting, Air Facilities, and Publishing Subsystems are presented.

AD-A076 110/6 PC **A03**/MF **A01**
Army Engineer Topographic Labs Fort Belvoir Va
Signal Signatures of Topographic Features Using Analog Technology.
Research note,
Pi-Fuay Chen , and William W. Seemuller. May 79, 36p Rept no. ETL-0185

Signal signatures and signatures of various spectral decompositions of selected topographic features, such as line roads, road intersections, and rectangular buildings, were developed by using analog signal processing techniques. The signal signatures were constructed in the spatial domain, and the corresponding signatures of various spectral components were obtained in the Walsh transform domain. An electronic system for generating two-dimensional Walsh functions for decomposition of topographic features was designed and built. A scheme for detecting the decomposed spectral components using an analog processor was presented. (Author)

LA-UR-79-1817 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Studies of Offshore Petroleum Leases Using a Cartographic Data Base System.
J. L. Sibert. 1979, 9p CONF-790739-3
Contract W-7405-ENG-36
Harvard computer graphics week '79, Cambridge, MA, USA, 15 Jul 1979.

An innovative system combining techniques of computer graphics and data base management has been developed at the Los Alamos Scientific Laboratory for the United States Geological Survey (USGS). The system is based on a CODASYL-type network data base management system. An interactive query language has been developed to allow standard data base retrievals as well as cartographic display of retrieval results. Map displays include both real-time display on a CRT terminal (such as a Tektronix 4014) and postprocessed full-color display on computer output microfilm. Since the system became operational early in 1978, it has been used in a number of ongoing studies for both the USGS and the Department of Energy (DOE). The primary application to date has been verification of the Lease, Production, and Revenue data (LPR) amassed by the USGS as part of its regulatory responsibility. Over 150 color-coded maps of offshore areas in the Gulf of Mexico have been produced for comparison with hand-drawn originals. This has proved to be an effective verification procedure, because differences between the maps are readily visible. Other current applications include provisions of both data and displays for statistical studies of bidding behavior of oil companies for both USGS and DOE projects. (ERA citation 04:052562)

8C. Dynamic Oceanography

AD-A075 636/1 Not available NTIS
Defence Research Establishment Pacific Victoria (British Columbia)
The Effect of Internal Waves on Surface Wind Waves 1. Experimental Measurements,
B. A. Hughes , and H. L. Grant. 23 Feb 77, 13p Rept no. DREP-78-1
Availability: Pub. in Jnl. of Geophysical Research, v83 nC1 p443-454, 20 Jan 78 (No copies furnished by DTIC).

No abstract available.

AD-A075 673/4 Not available NTIS
Defence Research Establishment Pacific Victoria (British Columbia)
The Effect of Internal Waves on Surface Wind Waves. 2. Theoretical Analysis,
B. A. Hughes. 23 Feb 77, 12p Rept no. DREP-REPRINT-78-2
See also AD-A075 636.
Availability: Pub. in Jnl. of Geophysical Research, v83 nC1 p455-465, 20 Jan 78 (No copies furnished by DTIC).

No abstract available.

AD-A075 899/5 PC **A02**/MF **A01**
Woods Hole Oceanographic Institution Mass
Observations of Interaction between the Internal Wavefield and Low-Frequency Flows in the North Atlantic.
Technical rept.,
Barry R. Ruddick , and Terrence M. Joyce. 26 Apr 78, 25p Rept nos. WHOI-79-62, WHOI-CONTRIB-4106
Contract N00014-76-C-0197
Pub. in Jnl. of Physical Oceanography, v9 n3 p498-517 May 79.

No abstract available.

AD-A075 904/3 PC **A03**/MF **A01**
Woods Hole Oceanographic Institution Mass
A Depth Controlled Tow System for Hydrographic and Current Measurements with Applications.
Technical rept.,
Eli Joel Katz , and Warren E. Witzell, Jr. 15 Jun 78, 28p WHOI-79-63, WHOI-CONTRIB-4137, NSF/IDOE-79-300
Contracts N00014-70-C-0205, N00014-74-C-0262
Pub. in Deep-Sea Research, v26A p579-596 1979.
Sponsored in part by N00014-77-C-0196, NSF-GX-34906, NSF-ATM73-00344 and NSF-OCE74-19608.

No abstract available.

AD-A076 067/8 PC **A03**/MF **A01**
National Research Council Washington Dc Ship Research Committee
A Summary of Wave Data Needs and Availability.
Final rept.,
M. D. Burkhart , E. S. Dillon , and O. H. Oakley. Aug 79, 29p
Contract DOT-CG-80356-A

The paper consists of three parts. First is a summary of the wave data needs of three classes of maritime interests: (a) designers of ships and floating and fixed offshore platforms, (b) regulatory bodies and classification societies primarily interested in safety and environmental protection, and (c) operators concerned with ship routing and offshore activities such as oil and mineral recovery and energy production. The second part is a summary of the status of wave data, and the third part is a set of conclusions. The present wave data base to meet the developing needs of designers of ship and offshore structures, regulatory bodies, and operators is incomplete. To complete it using only in situ measurement methods such as buoys appears impractical. However, these do have important use in the collection of data for special areas of interest, particularly where severe seas are known to occur, and for verification and calibration of hindcast and satellite measurement techniques. The two most promising means of developing the required wave climatology appear to be: (a) by hindcasting techniques and (b) by satellite observations. Hindcasting techniques, which can produce broadband directional spectra, are well advanced but require additional verification. Satellite techniques and hardware will not be available for some years. Visual observations by mariners continue; although these observations cannot provide quantitative (spectral) data, they are valuable for estimating long-term wave-height distribution. (Author)

AD-A076 248/4 PC **A10**/MF **A01**
Delaware Univ Newark Coll of Marine Studies
Wavelike Baroclinic Disturbances on Shallow Upper Ocean Density Fronts,
Richard A. Formato. Mar 79, 224p Rept no. CMS-C-1-79
Contract N00014-78-C-0071
Prepared in cooperation with Connecticut Univ., under contract N00014-75-C-0714.

A theoretical development of small amplitude wave disturbances on oceanic fronts is presented. The prototype front is the inshore boundary of the Gulf Stream, although the model encompasses a wider range of applicability. This work is an extension of recent research by Garvine which showed the importance of dissipation near the surface front, and earlier work by Duxbury on large scale time varying inviscid flow regimes. A two-layer model is considered in which the lower layer is much deeper than the upper, lighter layer. The upper layer, including the frontal zone, is then dynamically uncoupled from the lower layer. The frontal zone that forms the horizontal boundary of the upper layer is divided into two regions, a smaller, inner region in which the flow is dissipative and depends upon interfacial mass entrainment and turbulent friction, and a larger, outer region in which

the motion is inviscid. The boundary between these two regions is placed where the internal Froude number is of order one.

AD-A076 307/8 PC **A04**/MF **A01**
Coastal Engineering Research Center Fort Belvoir Va
A System for Using Radar to Record Wave Direction.
Technical rept.,
Michael G. Mattie , and D. Lee Harris. Sep 79, 53p Rept no. CERC-TR-79-1

A radar system provides images of waves in the coastal zone to obtain wave direction information is described. The heart of the system is an X-band marine radar which operates at 9,375 megahertz with a 3-centimeter wavelength and a 0.05-microsecond pulse width. The records are accumulated by photographing the plan position indicator (PPI) scope. The system is designed for unattended operation and includes an automation unit that activates the radar at preset times, usually at 2-hour intervals. A sequence of one to nine photos is obtained on each of four ranges after which the system turns off until the next scheduled observation. Wave images show single and multiple long-crested wave trains permitting observation of wave refraction and shoaling. The information content in the radar images is similar to that in aerial photos. However, radar images can be collected at night, during overcast, and in light rain conditions. Radar imagery is more limited than aircraft imagery in geographical coverage and in the quality of the imagery. Good agreement was found between estimates of wave direction and length obtained with radar and those obtained with other observational techniques. (Author)

8D. Geochemistry

LA-UR-79-1147 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Elucidation of Geomatrices by Laser Pyrolysis/Gas Chromatography and Pyrolysis/Mass Spectrometry.
C. E. R. Jones, and N. E. Vanderborgh. 1979, 22p CONF-790931-1
Contract W-7405-ENG-36
14. international symposium on advances in chromatography, Lausanne, Switzerland, 24 Sep 1979.

Present methods for the examination of organics entrained in geological matrices ae tedious even if not fallible. Thermal degradative techniques combined with the separatory power of a gas chromatographic column or a quadrupole mass spectrometer operating low-voltage electron impact mode afford rapid access to detailed profiles of such materials. The virtue of these parallel approaches are compared and contrasted in application to the elucidation of Devonian Shale and other geological material. (ERA citation 04:054180)

8E. Geodesy

AD-A075 987/8 PC **A05**/MF **A01**
Ohio State Univ Research Foundation Columbus
Intrinsic Geodesy.
Technical rept.,
Antonio Marussi. Mar 52, 97p WADC-TR-52-149
Contract AF 18(600)-90

No abstract available.

AD-A075 988/6 PC **A03**/MF **A01**
Ohio State Univ Research Foundation Columbus
The Gravity Field for an Ellipsoid of Revolution as a Level Surface.
Technical rept.,
Walter D. Lambert. May 52, 49p OSURF-TP-161, WADC-TR-52-151
Contract AF 18(600)-90

The form of a single level surface that envelops all attracting matter and the value of the potential or of the gravitational attraction at a definite point on or outside the surface determine uniquely the field of force on and outside of the surface. This statement holds good even when we add to the gravitational attraction the centrifugal 'force' due to uniform rotation. Hence, if we assume that the surface of the earth is an exact ellipsoid of rotation under its own attraction combined with the centrifugal force of uniform rotation about the minor axis, the field of force on and outside this ellipsoid is uniquely determined, if we assume, for instance, the value of gravity at the equator. This determination is carried out by means of a rather special set of curvilinear coordinates. In terms of these coordinates the value of the potential at any point in exterior space and the value of gravity are expressible in closed form in terms of Lengendre functions of the second kind with imaginary argument, and these again are expressible in terms of the elementary functions. In practice, however, it is found more convenient to expand the Lengendre functions in series, also the formulas dependent on them. Various incidental developments are given.

AD-A076 030/6 MF **A01**
Ohio State Univ Research Foundation Columbus
On Gravity Measurements at Sea.
Technical rept.,
Weikko A. Heiskanen. Feb 52, 29p WADC-TR-52-97
Contract AF 18(600)-90
Availability: Microfiche copies only.

As the gravity measurements at sea are very important for establishing the World Geodetic System the author gives a glimpse of the history, theroy and praxis of these measurements as well as of their reduction to sea level. The most important gravity measuring cruises will be listed. Some erroneous opinions concerning the speed and accuracy of the gravity measurements at sea will be corrected. (Author)

AD-A076 055/3 PC **A02**/MF **A01**
Ohio State Univ Research Foundation Columbus Mapping and Charting Research Lab
On the Possibility of Obtaining Geodetic Connections between two Distant Points on the Earth's Surface by Lunar Photography.
Technical rept.,
Arne E. Slettebak. Jan 52, 23p MCRL-TP-155, WADC-TR-52-93
Contract AF 18(600)-90

The use of lunar photography to obtain geodetic connections on the earth's surface has great advantages over the occultation and solar eclipse methods. The success of this method depends upon the accuracy with which a point on the moon's surface can be measured relative to the background of stars. The observational problem is a difficult one, but experiments now being carried out at the U. S. Naval Observatory should indicate whether the method of lunar photography is feasible for geodetic purposes. (Author)

AD-A076 114/8 MF **A01**
Virginia Polytechnic Inst and State Univ Blacksburg Dept of Engineering Science and Mechanics
Finite Element Models of the Earth's Gravity Field.
Final rept. on Phase 4,
Remi C. Engels , and John L. Junkins. 5 Oct 79, 152p ETL-0198
Contract DAAK70-78-C-0072
Availability: Microfiche copies only.

Methods are developed and demonstrated for constructing piecewise local models for gravity anomalies. The approach is shown to be computationally more efficient (by a factor of about 20) than competing methods. The report includes software listings and test cases. (Author)

N80-10907/7 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
Refraction Corrections for Surveying.
W. M. Lear. Aug 79, 20p NASA-TM-80803, REPT-79-FM-27

Optical measurements of range and elevation angle are distorted by the earth's atmosphere. High precision refraction correction equations are presented which are ideally suited for surveying because their inputs are optically measured range and optically measured elevation angle. The outputs are true straight line range and true geometric elevation angle. The 'short distances' used in surveying allow the calculations of true range and true elevation angle to be quickly made using a programmable pocket calculator. Topics covered include the spherical form of Snell's Law; ray path equations; and integrating the equations. Short-, medium-, and long-range refraction corrections are presented in tables.

8F. Geography

AD-A075 713/8 PC **A02**/MF **A01**
Quartermaster Research and Engineering Center Natick Ma
Preliminary Investigations of a Method to Predict Line-of-Sight Capabilities.
Research study rept.,
Walter F. Wood , and Joan B. Snell. Jul 59, 19p Rept no. QREC-EA-10

Recent basic research has shown that the geometry of the earth's surface is orderly. This research has progressed now to the point where it is possible to try for some practical applications of such knowledge. This report discusses the application of terrain research to line-of-sight problems for both military and civilian operations. It deals with the design, construction and preliminary test of a mathematical model for predicting the availability of unobstructed lines of sight from high points into valleys out as far as 20 miles from the viewing point. Results of these tests indicate the merits of the model and the direction of further research. A theoretical discussion of this possible research is presented. (Author)

8G. Geology and Mineralogy

AD-A075 902/7 PC **A02**/MF **A01**
Woods Hole Oceanographic Institution Mass
Resources of the Deep Sea Other than Manganese Nodules.
Technical rept.,
David A. Ross. Oct 79, 20p Rept nos. WHOI-79-61, WHOI-CONTRIB-4241
Contract N00014-74-C-0262, Grant OSG-04-8-M01-149
Pub. in Non-Nodule Resources, p54-68 1979.

No abstract available.

GJBX-130(79) PC **A13**/MF **A01**
Denver Research Inst., CO.
Investigation of the Relationship Between Organic Matter and Uranium Deposits.
J. J. Schmidt-Collerus. Jun 78, 295p
Contract EY-76-C-13-1664

Topical literature and the initial results of investigations on the relationship between organic matter and uranium ore formation are summarized. Primary emphasis is focused on the investigation of humic and fulvic acids and their uranium complexes as they occur in uraniferous peat deposits. Extraction and separation of humic and fulvic acids are presented and the initial results of fractionation of these materials by gel permeation and other methods are described. The potential relationship between organic matter and uranium is discussed and a working theory developed. Based on this theory the experimental research program was initiated. The experimental results obtained to date are encouraging and indicate the significant role of fulvic and humic acids in the formation of economic secondary uranium ore deposits. (ERA citation 04:054187)

NUREG/CR-1144 PC **A03**/MF **A01**
Kansas State Geological Survey, Lawrence.
Nemaha Uplift Seismotectonic Study: Regional Tectonics and Seismicity of Eastern Kansas.
Technical rept. 1 Oct-30 Sep 78,
Frank W. Wilson. Nov 79, 27p
Contract NRC-04-77-017

Progress and results of all work on this project to the end of its second year, or September 30, 1978 were reported in NUREG/CR-0666, published March 1979. Project third year activities and results include: (1) Continued operation of a regional microearthquake monitoring network which detected and located 26 regional events between October 1, 1978 and August 2, 1979. (2) Designing and building a triggering system to allow digitized recording of microearthquakes by a modified exploration seismograph. (3) Continued surface and

subsurface studies of selected areas along the Nemaha Uplift-Keweenanan Mafic belt trend. (4) Continued study of Precambrian rock types from recently drilled wells. (5) Beginning compilation of a fault catalog. (6) Terrain analysis and lineament studies which indicate that the alignment of stream drainages and divides are strongly controlled by basement and subsurface structure. (7) Continued reduction of gravity data for northeastern Kansas. A Bouguer gravity map probably will be available late Fall 1979. (8) Modification of the exploration seismograph system to a more efficient 12-channel Mini-Sosie system and completion of several line-miles of reflection profiling. (9) Beginning integration of data from Oklahoma, Nebraska and Iowa co-investigators.

PB80-103385 PC **A04**/MF **A01**
Illinois State Geological Survey, Urbana.
Reserves and Resources of Surface-Minable Coal in Illinois,
Colin G. Treworgy, Lawrence E. Bengal, and Amy G. Dingwell. 1978, 51p CIRC-504
Errata sheet inserted.

In making an inventory of the amount and geographic distribution of currently minable coal in Illinois, this new study used four generalized criteria: (1) reliability of data, (2) overburden and coal thickness, (3) tonnage of blocks of coal, and (4) proximity to manmade and natural obstacles. Coal having a thickness ranging from 18 to 108 inches and occurring at depths up to 125 feet was studied.

PB80-111099 PC **A04**/MF **A01**
World Data Center A for Solid Earth Geophysics, Boulder, CO.
Geodynamics International - 15.
Aug 79, 64p SE-19, NOAA-79091202
Prepared in cooperation with Inter-Union Commission on Geodynamics, Vancouver (British Columbia). Office of the Secretariat. See also report dated Apr 78, PB-284 851.

The Geodynamics Project is an international program of research on the dynamics and dynamic history of the earth with emphasis on deep-seated foundations of geological phenomena. This includes investigations related to movements and deformations, past and present, of the lithosphere and all relevant properties of the earth's interior and especially any evidence for motions at depth. The program is an interdisciplinary one, coordinated by the Inter-Union Commission on Geodynamics (ICG) established by ICSU at the request of IUGG and IUGS, with rules providing for the active participation of all interested ICSU Unions and Committees. This issue reports on commission activities, working group activities, highlights of scientific symposia, and national committee reports.

RHO-BWI-C-46 PC **A04**/MF **A01**
Woodward-Clyde Consultants, San Francisco, CA.
Magnetostratigraphy of the Grande Ronde Basalt Pasco Basin, Washington.
D. R. Packer, and M. H. Petty. Jan 79, 75p
Contract EY-77-C-06-1030

The paleomagnetic measurements of samples from the holes sampled have shown that there are four magnetic correlation lines, between adjacent flows in holes that have distinctly different mean stratigraphic inclinations, and two magnetic polarity boundaries that can be used for magnetic correlation in the Grande Ronde Basalt in the Pasco Basin. The results of paleomagnetic measurements of samples from the Wanapum Basalt and Saddle Mountains Basalt indicate that the potential for magnetostratigraphic correlation in these sequences is also good. (ERA citation 04:049287)

8H. Hydrology and Limnology

AD-A075 819/3 PC **A03**/MF **A01**
Geological Survey Tallahassee Fla Water Resources Div
Availability and Quality of Water from Shallow Aquifers in Duval County, Florida.
Water resources investigations,
L. V. Causey , and G. G. Phelps. Oct 78, 41p
Rept nos. USGS/WRD/WRI-79/078, USGS/WRI-78-92

The shallow-aquifer system in Duval County overlies the Floridan aquifer and is composed chiefly of sand, clay, sandy clay, and limestone. Thickness of the system ranges from about 300 to 600 feet. The upper 150 feet of deposits, consisting of the water-table and shallow-rock zones, are the most dependable and economical source of supplemental water supply. The principal shallow water-bearing zone is a limestone bed 40 to 100 feet below land surface. Aquifer tests conducted at 13 sites in Duval County show that yields from the shallow aquifer vary from place to place within the county owing chiefly to variations in lithology of the saturated rocks and sediments. The limestone of the shallow-rock zone will yield as much as 200 gallons per minute to wells; the maximum yield at most of the sites tested was between 30 and 100 gallons per minute. The water-table zone generally yields 10 gallons per minute or less but at one site, where a water-table well tapped a shell bed near land surface, the well yielded more than 40 gallons per minute. The quality of water in the shallow aquifer system in Duval County is generally acceptable for most domestic, commercial, and industrial uses. (Author)

COO-1599-153(Pt.1) PC **A04**/MF **A01**
Michigan State Univ., Hickory Corners. W.K. Kellogg Biological Station.
Dissolved Organic Matter and Lake Metabolism. Technical Progress Report, 1 July 1978--30 Jun 1979.
R. G. Wenzel. 1979, 68p
Contract EY-76-S-02-1599

Progress is reported in continuing investigations focused on integrated studies of the qualitative and quantitative cycling and metabolism of particulate and dissolved organic carbon in lakes and their inflow sources (surface and subsurface). Emphasis is placed on the sources, fates, and interactions of dissolved and particulate organic matter in relation to: (a) inorganic chemical cycling, (b) allochthonous loading to the lake system, and (c) the coupled nutrient physiology and metabolism of phytoplankton, bacterial populations, macrophytes, and attendant sessile algal-bacterial communities. Regulatory mechanisms of growth and rates of carbon and nutrient cycling are being evaluated among the (a) inorganic-organic influxes of allochthonous sources as they are controlled by wetland-littoral communities, (b) the littoral photosynthetic producer-decomposer complex, and (c) the microflora of the pelagial zone. Quantification of carbon fluxes among these components and control mechanisms is fundamental to elucidation of the rate functions of lake eutrophication. The integrated studies addressing these multifacted objectives are summarized in three summary diagrams. (ERA citation 04:052225)

PAT-APPL-6-052 657 PC **A02**/MF **A01**
Department of Agriculture, Washington, DC.
Iron Rod Technique for Measuring Surface Soil Watertables.
Patent Application,
William H. McKee. Filed 27 Jun 79, 9p PB80-114796
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The invention relates to a method for determining average soil water levels during wet seasons. The method involves inserting clean mild steel rods in the soil and measuring the depth of rust on the rods after 8 to 16 weeks. Mild steel rods rust rapidly in aerated soil above the water table but remain free of rust below the soil water table where air is excluded. This technique appears to work well on imperfectly and poorly drained soils.

PB80-106297 PC **A02**/MF **A01**
Texas Water Development Board, Austin.
Base-Flow Studies, Leon and Lampasas Rivers, Texas Quantity and Quality, January 16-17, 1968,
Jack Rawson, and Gerald K. Schultz. Jun 69, 16p TDWR/R-97
Prepared by Geological Survey, Reston, VA.Color illustrations reproduced in black and white.

The purposes of the investigation of the Leon and Lampasas Rivers were (1) to determine the quantity of tributary inflow and the amount of interchange of surface and ground water in the main streams, (2) to relate the nature and concentrations of dissolved constituents in the base flow to geology and to the activities of man, and (3) to evaluate the water for municipal supply, irrigation, and industrial use. During the study, conditions were favorable for determining gains and losses of streamflow; evapotranspiration was negligible, and most of the flow was sustained by ground water effluent. Moreover, only active diversion was located throughout the reaches studied.

PB80-110687 PC **A06**/MF **A01**
Water Resources Council, Washington, DC.
Nationwide Analysis. Appendix B. Estimated Flood Damages.
Jan 77, 103p
See also PB80-110695.

The Nationwide Analysis was conducted by the Water Resource Council's member agencies and reflects their viewpoints about the existing and future water and related land requirements. The report provides information on base year (1975) average annual flood damages and projected damages for 1985 and 2000 for 4 alternative levels of flood plain management.

8I. Mining Engineering

ALO-3992-1 PC **A99**/MF **A01**
New Mexico State Univ., Las Cruces.
Regional Operations Research Program for Development of Geothermal Energy in the Southwest United States. Final Technical Report, June 1977-August 1978.
J. M. Marlin, R. Christ, P. McDevitt, K. Nowotny, and P. O'Dea. Jan 79, 836p
Contract EG-77-S-04-3992

The efforts by the Core and State Teams in data acquisition, electric and non-electric economic studies, development of computer support functions and operations, and preparation of geothermal development scenarios are described. Team reports for the states of Arizona, Colorado, Nevada, New Mexico, and Utah are included in the appendices along with a summary of the state scenarios. (ERA citation 04:054509)

BNL-25957 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Concrete Polymer Materials as Alternate Materials of Construction for Geothermal Applications - Field Test Evaluations.
J. J. Fontana, and A. Zeldin. 1979, 22p CONF-790219-11
Contract EY-76-C-02-0016
AIME annual meeting, New Orleans, LA, USA, 18 Feb 1979.

A serious problem in the development of geothermal energy is the availability of durable and economical materials of construction for handling hot brine and steam. Hot brine and other aerated geothermal fluids are highly corrosive and they attack most conventional materials of construction. Brookhaven National Laboratory has been investigating the use of concrete polymer materials as alternate materials of construction for geothermal processes. To date, successful field tests have been demonstrated at the Geysers, US Bureau of Mines Corrosion Facility, and at the East Mesa Geothermal Facility. This is a survey of field and laboratory evaluations of concrete polymer materials which have been shown to be durable and economical as alternate materials of construction. (ERA citation 04:053094)

BNL-51013 PC **A08**/MF **A01**
Brookhaven National Lab., Upton, NY.
Cementing of Geothermal Wells. Progress Report No. 11, October-December 1978.
M. Steinberg, and L. E. Kukacka. Jun 79, 159p
Contract EY-76-C-02-0016

In a one month shake-down test at East Mesa, 32 cement formulations were exposed to flowing brine at 150 exp 0 C and 95 psig. Based upon the results from this test, 15 formulations were selected for evaluation in a 2 year test. Experimental work indicates that none of the cements under consideration cause severe corrosion to steel casing. Compared with the possible corrosive attack on the steel casing by the geothermal environment, the corrosive effects of the cement are

minimal. A promising cementing composition has been sent to the National Bureau of Standards for additional tests, and at least one more composition will be submitted. Pumpability tests performed on hydrothermal cements indicate several formulations that are pumpable for at least 2 hr at 316 exp 0 C. Polymer concrete samples containing 50 wt% styrene - 35 wt% acrylonitrile - 5 wt% acrylamide - 10 wt% divinyl benzene have not shown any reduction in strength after exposure to 25% brine at 240 exp 0 C for 8 months. This is the highest strength formulation to date and is the first formulation that has not exhibited any strength reduction after brine exposure. Strengths of 204 MPa and 162 MPa were measured at 20 exp 0 and 150 exp 0 C, respectively, after 8 months in brine. (ERA citation 04:053084)

CONF-780986-1 PC **A02**/MF **A01**
Argonne National Lab., IL.
Land Use and National Coal Surface Mining Policies.
M. M. Anderson, and J. P. Harper. 13 Sep 78, 11p
Contract W-31-109-ENG-38
Conference on resource and environmental policy and the future population/food fund, Arlington, VA, USA, 13 Sep 1978.

The prime cropland provisions of Public Law 95-87 are the only ones which can potentially cause major disturbances in production, and then only in the Midwest, particularly in Illinois. Even in Illinois, the known reserves under unprotected lands are several hundred times greater than current yearly production. Surface owner consent could prove troublesome if sufficient incentives are not provided to these land owners for permitting mining on their lands. While thousands of acres will be reclaimed under the Abandoned Mine Fund provisions, this must be viewed as a very long-term program to address the damages of over a century of virtually unregulated mining. On the aggregate level, the impacts of the land use provisions of P.L. 95-87 do not appear to significantly affect the availability of coal resources. However, future development plans of mine operators will have to be compatible with land use regulations, or delayed mine openings or expansions could adversely affect production. (ERA citation 04:025282)

CONF-790906-21 PC **A02**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
Chemical Logging: A Geothermal Technique.
R. E. McAtee, and C. A. Allen. 1979, 5p
Contract EY-76-C-07-1570
Geothermal Resources Council annual meeting, Reno, NV, USA, 24 Sep 1979.

Chemical logging studies conducted at the Department of Energy's Raft River Geothermal Test Site in south central Idaho resulted in the development of a technique to assist in geothermal well drilling and resource development. Calcium-alkalinity ratios plotted versus drill depth assisted in defining warm and hot water aquifers. Correlations between the calcium-alkalinity log and lithologic logs were used to determine aquifer types and detection of hot water zones 15 to 120 m before drill penetration. INEL-1 at the Idaho National Engineering Laboratory site in eastern Idaho represents the second area where this was applied. Calcium-alkalinity ratio, lithologic, and compensated neutron logs correlated well and were used to define the water-producing zones penetrated by the well. This well is located in an area of different geologic and hydrologic characteristics. (ERA citation 04:053066)

CONF-790906-22 PC **A02**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
Geochemical Modeling at Raft River.
C. A. Allen, R. E. Chaney, and R. E. McAtee. 1979, 8p
Contract EY-76-C-07-1570
Geothermal Resources Council annual meeting, Reno, NV, USA, 24 Sep 1979.

Chemical analysis of water from three depth regimes at the Raft River KGRA indicate the presence of at least two distinct hydrothermal fluids. One fluid predominates in the fracture system on the west side of the valley, known as the Bridge Fault. This fluid is characterized by low conductivity (2,000 to 3,000 mu s) and 6 to 9 mu g/ml F exp - . The second fluid, encountered in the center of the valley, appears to be associated with the Narrows Structure and is characterized by a conductivity of 6,000 to 11,000 mu s and F exp - of 3 to 6 mu g/ml. Contour mapping of conductivity and Cl exp - /F exp - ratios indicates upwelling of both deep geothermal fluids into the shallow system. This recharge into the intermediate and shallow zones produces high-conductivity water which is used for irrigation. Application of a simple mixing model shows that all the water sampled in intermediate and deep zones can be described by mixtures of two nearly pure fluids. One mechanism, consistent with the known data, is deep upwelling of a highly mineralized fluid which is heated by the basement rock and then penetrates sediment layers through fractures. The second fluid is relatively recent meteoric water conductively heated by the basement rock. (ERA citation 04:053065)

CONF-790906-23 PC **A02**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
Evaluation of Testing and Reservoir Parameters in Geothermal Wells at Raft River and Boise, Idaho.
D. W. Allman, D. Goldman, and W. L. Nierni. 1979, 4p
Contract EY-76-C-07-1570
Geothermal Resources Council annual meeting, Reno, NV, USA, 24 Sep 1979.

Evaluating the Raft River and Boise, Idaho, resources by pump and injection tests requires information on the geology, geochemistry, surficial and borehole geophysics, and well construction and development methods. Nonideal test conditions and a complex hydrogeologic system prevent the use of idealized mathematical models for data evaluation in a one-phase fluid system. An empirical approach is successfully used since it was observed that all valid pump and injection well pressure data for constant discharge tests plotted as linear trends on semilogarithmic plots of borehole pressure versus time since pumping or injection began. Quantification of the pressure response prior to 600 minutes is not always possible. Short-duration (< 24-hour) injection or pump tests are conducted with the drilling rig equipment, and long-duration (21-day) injection and pump tests are then conducted with the permanent pumping facilities. Replicate instrumentation for pressure, temperature, and flow rates are necessary to ensure quality data. Water quality and monitor well data are also collected. (ERA citation 04:053097)

COO-5085-2 PC **A02**/MF **A01**
Illinois Univ., Urbana.
Energy Analysis of Geothermal Energy Supply Systems. Second Quarterly Report.
R. A. Herendeen. 9 Apr 79, 5p
Contract ET-78-S-02-5085

An initial calculation was performed for hot-dry-rock (HDR) systems with emphasis on drilling costs. Using currently available data, a preliminary calculation for the net energy ratio of a 50 MW HDR plant was performed. The effect of using dynamic input-output models as opposed to static models is discussed. (ERA citation 04:053055)

DOE/EDP-0047 PC **A05**/MF **A01**
Department of Energy, Washington, DC.
Environmental Development Plan: Underground Coal Gasification.
Sep 79, 76p

The possibility that groundwater quality may be adversely affected by UCG is a major concern. Early tests indicate that some of the groundwater pollution due to UCG is confined to an area adjacent to the gasified zone and the cleansing properties of the surrounding coal may serve as a natural contaminant control system. Ground subsidence is another major concern. Subsidence could cause disruption of aquifers, surface disturbance, and loss of product gas through cracks to the surface. The DOE program, therefore, includes studies to predict subsidence and its effects through modeling in conjunction with extensive field measurements. Degradation of air quality is also a significant concern particularly with respect to emissions through cracks and fissures resulting from anticipated subsidence. Potential hazards to the worker exist including the inadvertent release of gas through cracks in the ground surface and worker safety associated with the sudden collapse through subsidence. Environmental regulations which will most directly affect the UCG program include the Federal Water Pollution Control Act, the Safe Drinking Water Act, and the Clean Air Act. These regulations will impact upon pollution control requirements, and potential siting of facilities. No specific emission or effluent requirements currently address UCG, but current efforts to characterize potential groundwater contamination and air emissions will form the basis for future guidelines. (ERA citation 04:054028)

DOE/EIA-0007/4 PC **A02**/MF **A01**
Energy Information Administration, Washington, DC.
Coal Supplement No. 1 to Winter Energy Data Bulletin of December 21, 1977.
1977, 9p

Coal production ceased at mines operating under the UMWA-BCOA contract with the expiration of that contract on December 6. Some western surface mines covered by recently negotiated contracts between the UMWA and individual (non-BCOA) companies continued production. Many nonunion mines, particularly in Kentucky, Ohio, Pennsylvania, Virginia, and West Virginia, were idled by pickets or sympathy strikes. The estimated net result of the first 4 days of the strike was a dropoff of about 6 million tons of production during the week ended December 10, compared with production during the week preceeding the strike. Coal presently supplies about 19% of the US energy requirement which is used for 46% of the Nation's output of electrical energy, 100% of the US coke production, and 15% of the total fuel requirement of industrial and manufacturing plants. Current domestic demand for coal for all uses totals about 13 million tons weekly. The deficit between coal received and coal consumed will be drawn down from existing stocks. Overall, stockpiles for the week ended December 10, 1977, are estimated to total 172 million tons. (ERA citation 04:051096)

DOE/ERD-0024 PC **A04**/MF **A01**
Department of Energy, Washington, DC.
Coal Extraction and Preparation Technology.
Jul 79, 55p

The evolving extraction, preparation, and transportation techniques receiving Department of Energy (DOE) support do not create new or substantially different environmental impacts from those of both previous and contemporaroy techniques. As the coal mining industry expands into new geographic regions, new and different environmental problems can be expected. For example, surface mining in western regions of the United States encounters special revegetation problems in arid environments. Impacts on hydrologic resources also require particular attention because the mined coal seam is frequently an important stratum for recharging aquifers. Unique environmental problems require research and assessment. The purpose of this Environmental Readiness Document is to assess the environmental impacts associated with the current and evolving industry and examine the environmental implications of increased coal utilization. Existing data and the collective judgment of Office of Environment (EV) scientists indicate that expansion in coal regions will be restricted physically by lack of resources, such as water, and institutionally by environmental protection laws and regulations. Restrictions will vary with regions; many will be extremely site specific. For instance, lack of sufficient water for land reclamation, solid waste disposal, and slurry pipelines will be especially significant concerns in arid regions of the southwest and northern Great Plains. The extent of restrictions will be governed by Federal, State, and local legislation and regulations concerning water use, allowable effluent concentrations, extent of required land reclamation, coal severence taxes, and protected wildlife habitat.Definitions of unpromulgated regulations or redefinition of preliminary regulations and guidelines resulting from Federal legislation will have a major impact on coal extraction, beneficiation, and transportation. (ERA citation 04:051059)

EPRI-EA-813 PC **A10**/MF **A01**
Martin Marietta Aerospace, Denver, CO. Denver Div.

Potential of Helium as a Guide to Uranium Ore. Final Report, July 1978.
Sep 77, 218p

The closest correlation between helium-in-soil-gas anomalies and subsurface (up to 250 meters deep) uranium deposits was found in the Southern Powder River Basin. Meaningful results were obtained only by collecting all samples in a short period of time. Helium measurements in groundwater were of potentially greater significance and of a greater magnitude. No clear correlation was found on large grids over the more deeply buried (250 to 900 meters) deposits in the Grants-Ambrosia Lake region. However, supplemental surveys conducted by Chemical Projects Limited on smaller grids in the same region do indicate a correlation. Again, helium in groundwater showed some very large concentrations in association with the ore deposits. The highest concentrations of helium-in-soil-gas yet observed were found in an expected background area at the Schwartzwalder mine. Subsequent drilling has located only minor mineralization. The explanation may lie in the structural complexity of the area. Other exploration techniques were used concurrently on a limited basis for comparison purposes: electronic radon alpha counting in the field, gamma-ray spectrometric analysis of soil samples, laboratory mass spectrometer measurements of exp 4 He/ exp 36 Ar and exp 4 He/ exp 22 Ne in soil gas samples, and chemical analysis of groundwater samples for uranium content. These other types of measurement in general did not yield results of great significance, largely because they were not made with a high enough density. Recommendations are made for future research in (1) developing and testing cumulative helium-in-soil-gas sampling systems and (2) developing further the helium-in-groundwater surveys. (ERA citation 04:025541)

FE-1231-16 PC **A04**/MF **A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Mining and Minerals Engineering.
Design Optimization in Underground Coal Systems. Sections 1--4. Interim Report, January--March 1979.
C. Haycocks. Jun 79, 66p
Contract EX-76-C-01-1231

Work continued on the longwall simulator with a more detailed examination of the potential for utilizing a roof characterization factor in the estimation of roof stability, both in the development entires as well as above the support line at the face. The proposed roof characterization factor, which is tentatively being incorporated at this time, is similar in general concept to that advanced by Terzaghi, 1946; Barton, 1974; and Bieniawski, 1976. The primary factors currently being utilized are strata thickness, moduli and interlayer relationships, joint densities, continuities, surface characteristics and orientations, and strata strengths. The development of such an approach using a roof-characterization factor for laminated rocks has encountered some special problems, particularly that related to inter-strata loading in the immediate roof. This loading is a factor in roof stability in addition to joint density and rock properties. Currently an arbitrary method of deciding which layers will load the underlying strata is being based upon the work developed using elastic analysis by Obert, Duvall and Merrill, 1960. The benefits of the roof characterization approach are a much more realistic evaluation of roof conditions, and therefore, a more accurate prediction of strata responses during underground mining. Work continued on the final report of the roof truss portion of the work. The report includes the theory, modeling method, experimental and field data, and the analysis and correlation of the above, in addition to recommendations concerning efficient installation and usage of roof trusses. The development and maintenance of computer programs used in the work are also discussed in detail. (ERA citation 04:051076)

FE-1747-3 PC **A03**/MF **A01**
Equity Oil Co., Salt Lake City, UT.
BX In Situ Oil Shale Project. Quarterly Technical Progress Report, September 1--November 30, 1977.
P. M. Duncan. 15 Dec 77, 33p
Contract ET-78-F-03-1747

Work focused on the tasks related to laboratory experimentation; project reactivation; mathematical modeling; design and installation of the instrumentation system; project design and construction; and environmental monitoring. Specific activities related to each of these principal task areas are reported. (ERA citation 04:052599)

FE-1747-5 PC **A03**/MF **A01**
Equity Oil Co., Salt Lake City, UT.
BX In Situ Oil Shale Project. Quarterly Technical Progress Report, March 1--May 31, 1978.
P. M. Duncan. 20 Jun 78, 41p
Contract ET-78-F-03-1747

Work on the BX In Situ Oil Shale Project consisted of finalization of design for instrumentation, well spacing, and equipment layout; the beginning of the drilling of injection and production wells; and the finalization of a contract with Stearns Roger Corporation to provide operating personnel for the project. (ERA citation 04:052600)

GJBX-105(79)(V.1) PC **A05**/MF **A01**
Western Geophysical Co. of America, Houston, TX. Aero Service Div.
Airborne gamma-Ray Spectrometer and Magnetometer Survey: Cody Quadrangle (Wyoming). Final Report.
May 79, 97p
Contract EY-76-C-13-1664

Data acquisition, production summary, data reduction, data presentation, geology, and interpretation are discussed for the Cody Quadrangle in Wyoming. (ERA citation 04:049513)

GJBX-105(79)(V.2) PC **A06**/MF **A01**
Western Geophysical Co. of America, Houston, TX. Aero Service Div.
Airborne gamma-Ray Spectrometer and Magnetometer Survey: Cody Quadrangle (Wyoming). Final Report.
May 79, 118p
Contract EY-76-C-13-1664

The histograms and the multiparameter profiles are presented with the anomaly maps and the flight path map for the Cody Quadrangle in Wyoming. (ERA citation 04:049514)

GJBX-107(79)(V.1) PC **E10**/MF **A01**
Geodata International, Inc., Dallas, TX.
Aerial Radiometric and Magnetic Survey: Dillon National Topographic Map, Idaho and Montana.
14 May 79, 192p
Contract EY-76-C-13-1664

Results of analyses of the airborne gamma radiation and total magnetic field survey flown for the region identified as the Dillon National Topographic Map NL12-7 is presented in Volume I and II of this report. The airborne data gathered is reduced by ground computer facilities to yield profile plots of the basic uranium, thorium and potassium equivalent gamma radiation intensities, ratios of these intensities, aircraft altitude above the earth's surface, total gamma ray and earth's magnetic field intensity, correlated as a function of geologic units. The distribution of data within each geologic unit, for all surveyed map lines and tie lines, has been calculated and is included. Two sets of profiled data for each line are included with one set displaying the above-cited data. The second set includes only flight line magnetic field, temperature, pressure, altitude data plus magnetic field data as measured at a base station. A general description of the area, including descriptions of the various geologic units and the corresponding airborne data, is included also. 8 figures, 9 tables. (ERA citation 04:049515)

GJBX-109(79) PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Hydrogeochemical and Stream Sediment Reconnaissance of the National Uranium Resource Evaluation Program. Primarily for the Rocky Mountain States of New Mexico, Colorado, Wyoming, and Montana and the State of Alaska. Semiannual Progress Report, April--September 1978.
P. L. Aamodt, G. R. Waterbury, M. E. Bunker, and R. A. Waller. Jun 79, 23p LA-7720-PR
Contract EY-76-C-13-1664

During this six-month period, Hydrogeochemical and Stream Sediment Reconnaissance (HSSR) samples were collected from approximately 60,000 locations in the Rocky Mountain states and Alaska. To date, all of the LASL Rocky Mountain region has been sampled at a nominal density of one location per 10 km exp 2 , and 65% of Alaska has been sampled at nominal densities of either one location per 23 km exp 2 (flatlands) or one location per 11 km exp 2 (mountains). Also during the report period, water samples from 13,771 locations were analyzed for uranium by fluorometry or delayed-neutron counting (DNC). Water samples from 12,993 locations were analyzed for 12 other elements by emission spectroscopy. Sediment samples from 8820 locations were analyzed for uranium and 31 other elements by combined DNC and neutron activation analysis. Sediment samples from 22,696 locations were analyzed for two additional elements by x-ray fluorescence. No data are given. Fourteen LASL reconnaissance reports, one pilot study data release, one quarterly progress report, and a manual of LASL HSSR field procedures were open filed by the Department of Energy, Grand Junction Office. (ERA citation 04:049516)

GJBX-112(79)(V.2) PC **A19**/MF **A01**
GeoMetrics, Inc., Sunnyvale, CA.
Aerial gamma Ray and Magnetic Survey: Powder River II Project, Gillette Detail. Final Report.
Jun 79, 450p
Contract EY-76-C-13-1664

The Gillette Detail area (about 90 square miles) lies at the northern end of the Black Hills in northeastern Wyoming. The Bear Lodge Mountains are the dominant topographic features in the area, with elevations as high as 6658 feet. The Black Hills Uplift in this region contains a maximum of 5000 feet of Mesozoic and Paleozoic strata overlying Precambrian crystalline basement. The dominent local geologic structure is the Bear Lodge Pluton, an alkaline igneous complex, occupying 20% of the study area. Magnetic data clearly define the main portion of the Tertiary igneous complex and some surrounding smaller intrusives. A few small, inactive thorium--rare earth prospects represent the only known mining activity in the study area. A total of 14 groups of samples in the uranium window constitute anomalies as defined in this report. The anomalies are normally associated with the intrusive bodies though some are found in adjoining sedimentary units. The largest concentration of uranium in the central portion of the large intrusive body did not show as an anomaly due to low U/T ratios caused by extremely high thorium window count rates (maximum of 1354 cps). Three geochemical units were defined on the basis of radiometric criteria set forth in Volume I of this report. The spatial distributions of these geochemical units showed varying correlations (and contrasts) with the geologic, magnetic, and topographic variations within the study area. (ERA citation 04:049518)

GJBX-113(79)(V.1) PC **E05**/MF **A01**
GeoMetrics, Inc., Sunnyvale, CA.
Aerial gamma Ray and Magnetic Survey: Powder River R and D Project. Portions of the Forsyth and Hardin, Montana, and the Sheridan, Arminto, Newcastle, and Gillette, Wyoming Quadrangles. Final Report.
May 79, 80p
Contract EY-76-C-13-1664

During the months of August through September, 1978, geoMetrics, Inc. flew approximately 1520 line miles of high sensitivity airborne radiometric and magnetic data in Wyoming and southern Montana within four 1 exp 0 x 2 exp 0 NTMS quadrangles (Arminto, Sheridan, Hardin and Forsyth), and 1390 lines miles in the detail area in eastern Wyoming, as part of the Department of Energy's National Uranium Resource Evaluation program. All radiometric and magnetic data were fully reduced and interpreted by geoMetrics, and are presented as three volumes (one Volume I and two Volume II's) in this report. The survey area lies largely within the northern Great Plains Physiographic Province. The deep Powder River Basin is the dominant structure in the area. Portions of the Casper Arch, Big Horn Uplift, and Porcupine Dome fall within the western limits of the area. The Basin is one of the largest and deepest in the northern Great Plains and contains over 17,000 feet of

Phanerozoic sediments at its deepest point. Economic deposits of oil, coal, bentonite and uranium are found in the Tertiary and/or Cretaceous rocks of the Basin. Epigenetic uranium deposits lie primarily in the Pumpkin Buttes - Turnercrest districts within arkosic sandstones of the Paleocene Fort Union Formation. A total of 62 groups of statistical values for the R and D area and 127 for the Arminto Detail in the uranium window meet the criteria for valid anomalies and are discussed in their respective interpretation sections. Most anomalies lie in the Tertiary sediments of the Powder River Basin. Some of the anomalies in the Arminto Detail are clearly related to mines or prospects. (ERA citation 04:051141)

GJBX-113(79)(V.2)(WYO) PC **A25**/MF **A01**

GeoMetrics, Inc., Sunnyvale, CA.
Aerial gamma Ray and Magnetic Survey: Powder River R and D Project, Arminto Detail, Wyoming. Final Report.
May 79, 584p
Contract EY-76-C-13-1664

The small detail area, 18 miles by 18 miles, lying near the center of the Powder River Basin, is covered entirely by sediments of the Eocene Wasatch Formation. Historically economic uranium deposits have been worked in the southeast corner of the area which includes the northern extremity of the Pumpkin Buttes district. 127 statistical uranium anomalies were generated for the study area, based on area wide statistics. (ERA citation 04:049520)

GJBX-115(79)(V.2) PC **A09**/MF **A01**

Geodata International, Inc., Dallas, TX.
Aerial Radiometric and Magnetic Survey: Little Rock National Topographic Map, Arkansas.
1979, 182p
Contract EY-76-C-13-1664

Flight line profile data and statistical analysis results from the aerial radiometric and magnetic survey of the Little Rock National Topographic Map area of Arkansas are presented in Volume 2. (ERA citation 04:049521)

GJBX-119(79)(V.2) PC **A08**/MF **A01**

Geodata International, Inc., Dallas, TX.
Aerial Radiometric and Magnetic Survey: Hamilton National Topographic Map, Idaho and Montana.
1979, 162p
Contract EY-76-C-13-1664

Volume II presents the flight line profile data and statistical analysis results from the aerial radiometric and magnetic survey of the Hamilton National Topographic Map area of Idaho and Montana. (ERA citation 04:049522)

GJBX-126(78)(V.1) PC **E11**/MF **A01**

High Life Helicopters, Inc., Puyallup, WA.
Aerial Radiometric and Magnetic Survey: Walker Lake National Topographic Map, Nevada and California.
15 Mar 78, 270p
Contract EY-77-C-13-1678

Geo-Life conducted an airborne gamma ray and total magnetic field survey during the period September 25--October 3, 1977, which covered a region of the states of Nevada and California identified as the Walker Field National Topographic Map, NJ 11-4. The specific area of this report was surveyed from an aircraft using large-volume radiation detectors with associated airborne electronic equipment. Each map line was flown in an east-west direction with an average length of 109 miles and each tie line was flown in a north-south direction with an average length of 69 miles. The area was surveyed from north to south. The Walker Lake NTMS is separated into two volumes, Volume 1 giving the description of the program and results, and Volume 2 presenting the flight line profile data and statistical analysis results. (ERA citation 04:025553)

GJBX-126(79)(V.1) PC **A04**/MF **A01**

Texas Instruments, Inc., Dallas.
Aerial Radiometric and Magnetic Reconnaissance Survey of Portions of Arizona, Idaho, Montana, New Mexico, South Dakota and Washinton. Volume 1. Instrumentation and Methods. Final Report.
Mar 79, 68p
Contract EY-76-C-13-1664

Instrumentation and methods described were used for a Department of Energy (DOE) sponsored high-sensitivity, aerial gamma-ray spectrometer and magnetometer survey of the Butte, Choteau, Cut Bank, Great Falls, Havre, Lewistown, Shelby (Montana); Pocatello, Twin Falls (Idaho); Ritzville (Washington); Hot Springs (South Dakota); and St. Johns (Arizona-New Mexico) NTMS, 1:250,000-scale quadrangles. The survey was carried out by Texas Instruments Incorporated under Bendix Field Engineering Corporation Sub-contract No. 78-184-L. The objective of the work was to define areas showing surface indications of a generally higher uranium content where detailed exploration for uranium would most likely be successful. A Sikorsky S-58T helicopter equipped with a high-sensitivity gamma-ray spectrometer and ancillary geophysical and electronic equipment was employed for areas having the ruggedest terrain, including all of Butte and Choteau Quadrangles. A DC-3 aircraft carrying a more sensitive gamma-ray spectrometer system was used in regions of flatter terrain, including all of Shelby and Lewistown Quadrangles. The systems were calibrated using DOE calibration facilities at Grand Junction, Colorado, and Lake Mead, Arizona. Gamma-ray spectometric data were processed to correct for variations in atmospheric, flight, and instrument conditions and were statistically evaluated to remove the effects of surface geologic variations. The resulting first-priority uranium anomalies (showing simultaneously valid eU, eU/eTh, and eU/K anomalies) were interpreted to evaluate their origin and significance. Results of the interpretation in the form of a preferred anomaly map, along with significance-factor profile maps, stacked profiles, histograms, and descriptions of the geology and known uranium occurrences are presented in the individual quadrangle volumes of this final report. (ERA citation 04:051145)

GJBX-126(79)(V.2C) PC **A13**/MF **A01**

Texas Instruments, Inc., Dallas.
Aerial Radiometric and Magnetic Reconnaissance Survey of Portions of Arizona, Idaho, Montana, New Mexico, South Dakota and Washington. Volume 2-C. Havre Quadrangle. Final Report.
Jun 79, 280p
Contract EY-76-C-13-1664

The results of a high-sensitivity, aerial, gamma-ray spectrometer and magnetometer survey of the Havre Quadrangle, Montana, are presented. Instrumentation and methods are described in Volume 1 of this final report. This work was done by Texas Instruments Incorporated under Bendix Field Engineering Corporation Subcontract No. 78-184-L as part of the US Department of Energy National Uranium Resource Evaluation (NURE) Program. Statistical and geological analysis of the radiometric data revealed 61 uranium anomalies worthy of field-checking as possible prospects. There are 28 anomalies associated with the Judith River Formation. Lignite beds in this formation may have created an environment favorable for the precipitation of uranium from uranium-rich ground waters in a regional flow system bounded by the Milk River. Source rocks for uranium in the ground water could be younger rocks with abundant volcanic ash and bentonite to the north and south of the river, and the igneous rocks of the Bearpaw Mountains in the southwest. Numerous anomalies in the Bearpaw and Claggett shales may have been caused by extensive exposures of bentonite. There are seven anomalies in the Fox Hill Sandstone or the Colorado Shale that may be indicative of uranium prospects. Six anomalies pertaining to Tertiary rocks may indicate possible uranium mineralization in veins in igneous rocks. Four of these are associated with mafic igneous rocks characterized by unusually high radiometric content. Twenty anomalies related to Quaternary units may be significant in that they may be demonstrative of uranium-rich source rocks that could host uranium mineralization. (ERA citation 04:049523)

GJBX-126(79)(V.2D) PC **A11**/MF **A01**

Texas Instruments, Inc., Dallas.
Aerial Radiometric and Magnetic Reconnaissance Survey of Portions of Arizona, Idaho, Montana, New Mexico, South Dakota and Washington. Volume 2-D Choteau Quadrangle. Final Report.
May 79, 230p
Contract EY-76-C-13-1664

The results of a high-sensitivity, aerial, gamma-ray spectrometer and magnetometer survey of the Choteau Quadrangle, Montana, are presented. Instrumentation and methods are described in Volume 1 of this final report. This work was done by Texas Instruments Incorporated under Bendix Field Engineering Corporation Subcontract No. 78-184-L as part of the US Department of Energy National Uranium Resource Evaluation (NURE) Program. Statistical and geological analysis of the radiometric data revealed 41 uranium anomalies worthy of field-checking as possible prospects. Twenty anomalies may be caused by uranium mineralization in Precambrian quartzites, argillites, and limestones. One anomaly in particular is very strong and extends about a half mile over three geologic units. One anomaly occurring over Cambrian rocks may reflect the presence of a deposit similar to the Blind River and Rand deposits; however, it is just as likely that it is related to a shale sequence in predominantly limestone rocks. Six anomalies associated with highly faulted Paleozoic rocks along the eastern boundary of the Rocky Mountains may contain uranium mineralization in limestones, dolomites, or sandstones. Sandstone-type uranium deposits may be indicated by 10 preferred anomalies in Cretaceous sedimentary rocks in the Great Plains physiographic province on the eastern side of the quadrangle. Many anomalies in Quaternary units may reflect the existence of uranium-rich source rocks that may host uranium prospects. (ERA citation 04:049524)

GJBX-126(79)(V.2F) PC **A12**/MF **A01**

Texas Instruments, Inc., Dallas.
Aerial Radiometric and Magnetic Reconnaissance Survey of Portions of Arizona, Idaho, Montana, New Mexico, South Dakota and Washington. Volume 2-F. Lewistown Quadrangle. Final Report.
Jun 79, 264p
Contract EY-76-C-13-1664

Results of a high-sensitivity, aerial, gamma-ray spectrometer and magnetometer survey of the Lewistown Quadrangle, Montana, are presented. Instrumentation and methods are described in Volume 1 of this final report. Statistical and geological analysis of the radiometric data revealed 58 uranium anomalies worthy of field-checking as possible prospects. One anomaly may be associated with the Cambrian Flathead Quartzite that may contain deposits similar to the Blind River and Rand uranium deposits. Three anomalies may be indicative of sandstone-type deposits in Jurassic rocks, particularly the Morrison Formation, which hosts uranium mineralization elsewhere. One of the latter anomalies is also related to rocks of the Mississippian Madison Group, and this suggests the possible presence of uranium in limestones of the Mission Canyon Formation. There are 45 anomalies related to the Cretaceous rocks. Lignite in the Hell Creek and Judith River formations and Eagle Sandstone may have caused the formation of 22 epigenetic uranium deposits. Many anomalies occur in the Bearpaw Shale and Claggett Formation. However, only five are considered significant of the remainder are expected to be caused by large amounts of radioactive bentonite or bentonitic shale. Two other Cretaceous units that may host sandstone-type deposits are the Colorado Shale and Kootenai Formation that register 16 and two anomalies respectively. Only one anomaly pertains to Tertiary rocks, and it may be indicative of vein-type deposits in the intrusives of the Judith Mountains. These rocks may also act as source rocks for deposits surrounding the Judith Mountains. Eight anomalies related only to Quaternary units may be demonstrative of uranium-rich source rocks that could host uranium mineralization.Several anomalies are located close to oil fields and may have been cause by radium-rich oil-field brines. (ERA citation 04:049525)

GJBX-126(79)(V.2G) PC **E09**/MF **A01**

Texas Instruments, Inc., Dallas.

Aerial Radiometric and Magnetic Reconnaissance Survey of Portions of Arizona, Idaho, Montana, New Mexico, South Dakota and Washington. Volume 2-G. Butte Quadrangle. Final Report.
Mar 79, 482p
Contract EY-76-C-13-1664

The results of a high-sensitivity, aerial, gamma-ray spectrometer and magnetometer survey of the Butte Quadrangle, Montana, are presented. Instrumentation and methods are described in Volume 1 of this final report. This work was done by Texas Instruments Incorporated under Bendix Field Engineering Corporation Subcontract No. 78-184-L as part of the US Department of Energy National Uranium Resource Evaluation (NURE) Program. Statistical and geological analysis of the radiometric data revealed 74 anomalies worthy of field checking as possible prospects. Thirty-nine anomalies are associated with Precambrian quartzites and argillites that may contain uranium-rich veins. Other vein-type uranium prospects may be the causes of 20 preferred anomalies related to Cretaceous and Tertiary igneous rocks, particularly the eight anomalies associated with the Boulder batholith. Sandstone-type deposits may be indicated by 18 preferred anomalies in Cretaceous and Tertiary sedimentary rocks and 18 in Quaternary units. Many of those in the Quaternary may be caused by uranium-rich source rocks. Anomalies that may reflect the presence of deposits similar to the Blind River and Rand may be associated with Cambrian quartzites. Several preferred anomalies in the Butte Quadrangle may be caused by this type of deposit. One anomaly may indicate the presence of a phosphate deposit with possible by-product uranium. (ERA citation 04:049526)

GJBX-126(79)(V.2J) PC **A11**/MF **A01**
Texas Instruments, Inc., Dallas.
Aerial Radiometric and Magnetic Reconnaissance Survey of Portions of Arizona, Idaho, Montana, New Mexico, South Dakota and Washington. Volume 2-J. Ritzville Quadrangle. Final Report.
Jul 79, 242p
Contract EY-76-C-13-1664

The results of a high-sensitivity, aerial, gamm-ray spectrometer and magnetometer survey of the Ritzville Quadrangle, Washington, are presented. Instrumentation and methods are described in Volume 1 of this final report. This work was done by Texas Instruments Incorporated under Bendix Field Engineering Corporation Subcontract No. 78-184-L as part of the US Department of Energy National Uranium Evaluation (NURE) Program. Statistical and geological analysis of the radiometric data revealed 48 uranium anomalies worthy of field-checking as possible prospects. The most noteworthy anomaly is in the northeast near the Midnite and Lucky Charm uranium mines in the Precambrian Togo Formation. Nine anomalies in the same area may be indicative of vein-type deposits in igneous instrusions. The majority of anomalies are associated with the Tertiary Columbia River Group, and most are thought to be attributable to uranium-rich tuffaceous volcanics in the low-uranium basalts of the Columbia River Group. Only seven are considered significant. The tuffaceous rocks could have been the source of uranium leached by weathering and precipitated in favorable environments to form nearby deposits. Numerous anomalies coincide with roads, railroads, and towns and are most likely caused by road fill or other construction material transported into those areas. The anomalies that outline a northeast-trending belt in the west may be structurally controlled and may contain uranium in pegmatites. It is also possible that they are due to exposure of tuffaceous volcanics in the basalts. (ERA citation 04:049527)

GJBX-126(79)(V.2L) PC **A12**/MF **A01**
Texas Instruments, Inc., Dallas.
Aerial Radiometric and Magnetic Reconnaissance Survey of Portions of Arizona, Idaho, Montana, New Mexico, South Dakota and Washington. Volume 2-L. St. Johns Quadrangle. Final Report.
Jul 79, 256p
Contract EY-76-C-13-1664

The results of a high-sensitivity, aerial, gamma-ray spectrometer and magnetometer survey of the St. Johns Quadrangle, Arizona and New Mexico, are presented. Instrumentation and methods are described. This work was done by Texas Instruments Incorporated under Bendix Field Engineering Corporation Subcontract No. 78-184-L as part of the US Department of Energy National Uranium Resource Evaluation (NURE) Program. Statistical and geological analysis of the radiometric data revealed 58 uranium anomalies worthy of field-checking as possible prospects. The most noteworthy feature in the St. Johns Quadrangle is the uraniferous province associated with the Triassic Chinle Formation in the west. There are 18 anomalies that indicate the possibility of finding sandstone-type U prospects in the Chinle Formation. Two anomalies are associated with the Triassic Moenkopi Formation and one with the Jurassic Rocks of the San Rafael Group. Significant anomalies related to Cretaceous units include one in the Dakota Sandstone and four in the Mesaverde Group. Tertiary rocks may host sandstone- and vein-type deposits. Possible sandsone-type U is indicated by two anomalies in the Baca Formation and seven in the Bidahochi Formation. Those in the Bidahochi Formation may reflect the presence of local accumulations of bentonite. Ten anomalies in the Datil Formation may have been caused by vein-type deposits, but U-rich felsic volcanics are also a distinct possibility. Many anomalies associated with Quaternary volcanics may reflect vein deposits in felsic volcanics, but the felsic volcanics themselves could create false anomalies. Four anomalies are considered strongenough to be significant. Anomalies associated with Quaternary deposits may be indicative of material derived from uranium-rich units that could host mineralization. Anomalies coinciding with roads, railroads, and towns are most likely caused by construction material transported into those areas. (ERA citation 04:049529)

GJBX-131(78) PC **E02**/MF **A01**
Bendix Field Engineering Corp., Grand Junction, CO.
Preliminary Study of the Uranium Potential of the Dan River Triassic Basin System, North Carolina and Virginia.
J. R. Dribus. Oct 78, 31p
Contract EY-76-C-13-1664

A preliminary geologic investigation was conducted to determine the uranium potential of the Triassic strata in the Dan River basin system (Dan River, Danville, and Davie County Triassic basins) of North Carolina and Virginia. The pre-Triassic Inner Piedmont basement rocks adjacent to the basins were investigated as potential sources of uranium. Outcrops of Triassic and basement rocks were examined and measured for surface radioactivity by scintillometer. Representative rock and saprolite samples were collected for laboratory analyses. The pre-Triassic basement terrain contains weathered granites which have contributed detritus to the basin system and which may have served as primary sources for uranium. The intertongued, hematitic arkoses and black, carbonaceous pyritic shales that constitute the Triassic sequence are favorable uranium host rocks; and possible structural, stratigraphic, and porosity traps for uranium are abundant throughout the basins. On the basis of these factors and the chemical uranium anomalies of 5X and 10X background detected at the surface, uranium mineralization at depth in the Triassic strata of the Dan River basin system is suggested. Applying data gathered by the surface investigation to conditions expected in the subsurface, four specific areas are anticipated as favorable sites for uranium mineralization: (1) along the unconformable contact between the Triassic sequence and the pre-Triassic basement rocks; (2) along the contacts between bleached aureole rocks (associated with diabase dikes) and unaltered, red clastics; (3) within structural and porosity traps created where faulting has positioned black shales adjacent to red arkose and by impermeable barriers such as diabase intrusives or shear zones; (4) within stratigraphic traps created by lithosomal intertonguing of black shales and red sandstones. (ERA citation 04:025556)

GJBX-54(79) PC **E05**/MF **A01**
Oak Ridge Gaseous Diffusion Plant, TN.
Hydrogeochemical and Stream Sediment Reconnaissance Basic Data for Wichita NTMS Quadrangle, Kansas.
9 Mar 79, 203p K/UR-117
Contract EY-76-C-13-1664

Field and laboratory data are presented for 741 groundwater and 765 stream sediment samples. Statistical and areal distributions of uranium and possible uranium-related variables are displayed. Groundwater data indicate that the most promising area for potential uranium mineralization occurs in the southwestern part of the quadrangle. Units in this area are the Permian Sumner and Nippewalla Groups. The uranium concentrations are associated with high values of arsenic, vanadium, and, to a lesser degree, molybdenum and selenium. Saline indicators are also present in this area and are probably a reflection of the evaporite deposits and saline residues contained in both of these groups. Stream sediment data indicate that high uranium values occur primarily in the north central area of the quadrangle and that the uranium in this area is in a soluble form. Rocks cropping out in this area belong to the Permian Chase and Sumner Groups. Other high uranium values throughout the quadrangle are associated with a variety of heavy and/or resistate mineral assemblages. (ERA citation 04:042352)

GJBX-63(79) PC **E07**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Poplar Bluff 1 exp 0 X 2 exp 0 NTMS Area, Missouri and Arkansas: Data Release.
J. D. Heffner. Apr 79, 363p DPST-79-146-6
Contract EY-76-C-13-1664

Stream sediment and stream water samples were collected from small streams at 680 sites in rural areas. Ground water samples were collected at 1350 sites. Neutron activation analysis (NAA) results are given for uranium and 16 other elements in sediments, and for uranium and 9 other elements in ground water and surface water. (ERA citation 04:042360)

GJBX-66(79)(V.2) PC **A08**/MF **A01**
Geodata International, Inc., Dallas, TX.
Aerial Radiometric and Magnetic Survey: Goldfield National Topographic Map, California and Nevada.
1979, 151p
Contract EY-76-C-13-1664

The flight line profile data and statistical analysis results from the aerial radiometric and magnetic survey of the Goldfield National Topographic Map area of California and Nevada. (ERA citation 04:040354)

GJBX-78(79) PC **A09**/MF **A01**
Geological Survey, University, AL.
Geology of the Birmingham, Gadsden, and Montgomery 1 exp 0 X 2 exp 0 NTMS Quadrangles, Alabama.
C. W. Copeland, and M. A. Beg. Apr 79, 192p
DP-1530
Contract EY-76-C-13-1664

This document is a facsimile edition (with accompanying maps) of geologic reports on the Birmingham, Gadsden, and Montgomery 1 exp 0 x 2 exp 0 NTMS quadrangles prepared for SRL by the Geological Survey of Alabama. The purpose of these reports is to provide background geologic information to aid in the interpretation of NURE geochemical reconnaissance data. Each report includes descriptions of economic mineral localities as well as a mineral locality map and a geologic map. (ERA citation 04:042367)

GJBX-80(79) PC **A05**/MF **A01**
Consolidated Controls Corp., Springfield, VA.
Calculated Time-Correlated Neutron-Induced Radiations in a Sandstone Formation. Final Report.
C. W. Peters, and E. I. Karaoglan. Mar 79, 98p
Contract EY-76-C-13-1664

The following signals from the proposed Borehole Neutron Diagnostic Probe, which uses the associated particle technique for timing and spatial resolution of the events produced by 14 MeV neutrons, in a 4.5 inch borehole in a sandstone formation were investigated: (1) The inelastic gamma-ray spectrum by a gamma ray spectrometer whose signal input is correlated with the time emission of a 14 MeV neutron into the formation. (2) The cap-

ture gamma-ray spectrum measured by a gamma ray spectrometer whose signal input is not correlated with neutron emission and has the time correlated events gated out. (3) The time dependence of the inelastic gamma-ray signal. (4) The time dependence of the capture gamma-ray signal. (5) The measured coincidence signal from the detection of prompt gamma rays and prompt neutrons from fission. (ERA citation 04:051140)

GJO-1659-4 PC **A08**/MF **A01**
Pennsylvania State Univ., University Park.
Ground Water Geochemistry as a Prospecting Tool for Uranium Deposits in Pennsylvania.
K. R. Applin, and D. Langmuir. Aug 78, 155p
GJBX-132(78)
Contract EY-76-C-13-1659

Ground waters in northeastern and eastern Pennsylvania were collected and analyzed to appraise their value in geochemical prospecting for U occurrences. Private wells, springs, and seepages near known U mineralization were sampled during the summer of 1976 and late spring of 1977. Field measurements of specific conductance, temperature, pH, Eh, DO were taken at each site. In the laboratory, the samples were analyzed for Ca, Mg, Na, K, Cd, Co, Cr, Cu, Fe, Mn, Ni, Pb, U, V, Zn, Cl, HCO sub 3 , PO sub 4 , and SO sub 4 . Dissolved U was determined by fission track analysis. The dissolved U content of the northeastern samples ranged from less than 0.01 to 7.8 ppB with a mean of 1.5 ppB. The eastern samples contained from less than 0.01 to 1.2 ppB with a mean of 0.05 ppB. U and Rn anomalies were detected in two eastern samples. Because ground water flow in this area is predominantly fracture-controlled, the detection of occurrences is limited by the extent and abundance of permeable fractures intersecting and surrounding them. Sixteen anomalies were found in the northeastern region in zones previously recognized as anomalous by stream sediment analyses. Anomalies found east of Beaver Lake substantiate previous speculations that additional mineralization occurs in this area. In both regions, anomalies were found in samples having alkaline pH's and elevated dissolved solids and bicarbonate contents. Other than Rn, no pathfinders for U were identified.In most temperate climates, ground water prospecting for U is best practiced in conjunction with stream sediment analyses. In regions of highly anisotropic and shallow ground water flow, ground water and stream sediment sampling programs should probably be designed by watershed rather than according to an orthogonal grid arrangement. (ERA citation 04:025557)

HCP/T9127-01 PC **A05**/MF **A01**
Dravo Corp., Pittsburgh, PA. Civil, Mining and Marine Div.
Development of Lining and Service Line Extension Systems Compatible with BSB Excavation Rates. Final Report.
19 Dec 78, 82p
Contract ET-77-C-01-9127

Phase I Design, of this project has developed a lining and service line extension system which can be used with the Blind Shaft Borer during a shaft sinking operation. Using precast concrete segments, 12" thick, 8' to 4" high and 60 exp 0 arc length, the system is capable of installing a shaft lining with an internal diameter of 22' at a steady state rate of 50' per day. To achieve this rate of advance, 2 courses of 6 segments each will be installed and grouted each 8 hour shift, 3 shifts per day. The service line extension system has the unique capability of providing an uninterrupted flow of ventilation air down the shaft to the work area. (ERA citation 04:045863)

IDO-1546-T1 PC **A04**/MF **A01**
Terra Tek, Inc., Salt Lake City, UT.
Support Research for Development of Improved Geothermal Drill Bits. Semi-Annual Report.
R. R. Hendrickson, A. H. Jones, S. J. Green, and R. W. Winzenried. Dec 77, 68p
Contract EY-76-C-07-1546

Progress is summarized on: material selection, fabrication and testing of MK-II bits; and seal and lubrication evaluation. Candidate steel and carbide properties were evaluated in laboratory tests before final selections were made for the MK-II bit. The sealed bit program covers extensive testing of conventional elastomeric seals, experimental elastomeric seals, and experimental heterogeneous seals, as well as lubricant tests using a specially constructed test machine. (ERA citation 04:053085)

IDO-1546-T2 PC **A05**/MF **A01**
Terra Tek, Inc., Salt Lake City, UT.
Support Research for Development of Improved Geothermal Drill Bits. Annual Report.
R. R. Hendrickson, R. W. Winzenried, A. H. Jones, and S. J. Green. Jul 78, 91p
Contract EY-76-C-07-1546

Work is summarized on material selection, fabrication, and testing of Mk-III bits and seal and lubricant evaluation. (ERA citation 04:053086)

IDO-1581-T1 PC **A06**/MF **A01**
Terra Tek, Inc., Salt Lake City, UT.
Program for the Improvement of Downhole Drilling Motor Bearings and Seals. Phase II, Final Report.
A. D. Black, P. H. DeLafosse, J. G. Wilson, G. A. Tibbitts, and S. J. Green. May 78, 112p
Contract EG-76-C-07-1581

Progress in the following areas is summarized: seal testing and evaluation, bearing-seal package testing and evaluation, and lubricant testing and evaluation. (ERA citation 04:053087)

IDO-1583-T1 PC **A04**/MF **A01**
Terra Tek, Inc., Salt Lake City, UT.
Study of Private Enterprise Development on the Raft River KGRA. Final Progress Report.
S. J. Green, W. S. Brown, and P. D. Meldrum. Jul 77, 73p
Contract EY-76-C-07-1623

Information, analysis, and conclusions based on the small for-profit venture business model are presented. The necessary tasks are described and progress is reviewed. Water availability and business analysis problems are described. Included in the appendix are materials on land availability, characterization of geothermal resources under Idaho law, and greenhouse analysis and geothermal applications. (ERA citation 04:053063)

IS-4701 PC **A02**/MF **A01**
Ames Lab., IA.
Selective Magnetic Enhancement of Pyrite in Coal by Dielectric Heating. Quarterly Technical Progress Report, January 1, 1979--March 31, 1979.
D. D. Bluhm. Jun 79, 15p
Contract W-7405-ENG-48

The magnetic susceptibility of pyrite in coal is being enhanced by the use of selective pretreatments such as dielectric heating and chemical oxidation. Dielectric properties measurements were continued by selection of representative coals. Dielectric heating at 2.45 GHz has been done using a one-fourth height WR-340 slotted waveguide. Experiments on the parallel plate applicator that was developed for use at 27 MHz have not been successful. Measurements are now being continued over a broad range of the frequency spectrum since there may be an optimum frequency where pyrite may be heated significantly faster than coal. An AGA scanning infrared system was employed to dramatically illustrate the difference in rate of dielectric heating of coal and pyrite. Preliminary results show that there is a definite increase in mass susceptibility when Childers pyrite is subjected to microwave dielectric heating. (ERA citation 04:048041)

K/UR-125 PC **A12**/MF **A01**
Oak Ridge Gaseous Diffusion Plant, TN.
Hydrogeochemical and Stream Sediment Reconnaissance Basic Data for Amarillo NTMS Quadrangle, Texas.
31 May 79, 263p
Contract W-7405-ENG-26

Results of a reconnaissance geochemical survey of the Amarillo Quadrangle, Texas are reported. Field and laboratory data are presented for 1,116 groundwater and 644 stream sediment samples. Statistical and areal distributions of uranium and possible uranium-related variables are displayed. A generalized geologic map of the survey area is provided, and pertinent geologic factors which may be of significance in evaluating the potential for uranium mineralization are briefly discussed. The groundwater data indicate three different areas with anomalous uranium concentrations. The largest area is located in the west central part of the quadrangle where wells produce from Permian and Triassic units. This trend passes through Hutchinson, Moore, and Potter Counties. A second area is located in the southeast portion of the quadrangle where wells produce from Permian units. In the southwest corner, high uranium concentrations were observed in groundwaters produced from the Ogallala Formation. In all three trends, associated elements reflect the pesence of brines and evaporite deposits. Sandstone-type associations do occur in the Ogallala Formation. Stream sediment data indicate that most of the uranium in sediments from the Ogallala and Quaternary deposits occurs as resistate and heavy minerals. (ERA citation 04:051147)

LA-UR-79-1920 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Hot Dry Rock Geothermal Heat Extraction.
H. D. Murphy. 1979, 5p CONF-790906-8
Contract W-7405-ENG-36
Geothermal Resources Council annual meeting, Reno, NV, USA, 24 Sep 1979.

A man-made geothermal reservoir has been created at a depth of 2.7 km in hot, dry granite by hydraulic fracturing. The system was completed by directionally drilling a second well in close proximity with the top of the vertical fracture. In early 1978 heat was extracted from this reservoir for a period of 75 days. During this period thermal power was produced at an average rate of 4 MW(t). Theoretical analysis of th measured drawdown suggests a total fracture heat transfer area of 16,000 m exp 2 . Viscous impedance to through-flow declined continuously so that at the end of the experiment this impedance was only one-fifth its initial value. Water losses to the surrounding rock formation also decreased continuously, and eventually this loss rate was less than 1% of the circulated flow rate. Geochemical analyses suggest that, with scale up of the heat transfer area and deeper, hotter reservoirs, hot dry rock reservoirs can ultimately produce levels of power on a commercial scale. (ERA citation 04:051398)

LBL-7067 PC **A03**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Heat Exchanger Design: Why Guess a Design Fouling Factor when It Can Be Optimized.
W. L. Pope, H. S. Pines, R. L. Fulton, and P. A. Doyle. Jun 78, 39p CONF-781112-3
Contract W-7405-ENG-48
ASME energy technology conference, Houston, TX, USA, 5 Nov 1978.

A new general surface heat exchanger design relationship is derived that uniquely relates the optimum design fouling resistance and the optimum design heat transfer coefficient with the ratio of cleaning cost to capital plus operating costs, at the optimum design condition. Implementation of this simple result to practical problems in design, however, requires numerical techniques. A new shell and tube heat exchanger design program, SIZEHX, is applied to a problem of current interest to confirm the derivation. SIZEHX can cost effectively perform single-step, multiparameter cost optimizations on single phase or supercritical exchanger arrays with variable fluid properties and arbitrary linear fouling for single-pass, segmentally baffled shell-and-tube configurations for a variety of fluid pairs, including hydrocarbon mixtures. The economic influence of several general design parameters on a geothermal exchanger are presented in the form of 3-D computer generated plots. (ERA citation 04:026142)

LBL-9326 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Status of Geothermal Reservoir Engineering Research Projects Supported by USDOE/Division of Geothermal Energy.
J. H. Howard, and W. J. Schwarz. Jul 79, 5p
CONF-790906-5
Contract W-7405-ENG-48

Geothermal Resources Council annual meeting, Reno, NV, USA, 24 Sep 1979.

In the fall of 1977, the US Department of Energy (DOE), Division of Geothermal Energy (DGE) proposed that Lawrence Berkeley Laboratory (LBL) assume lead responsibility, on DGE's behalf, for geothermal reservoir engineering. This summary discusses briefly the DOE/DGE-sponsored geothermal reservoir engineering research program which includes LBL in-house research and research done by others through LBL. LBL in-house research has emphasized improvement of well test analysis methods and the development of geothermal reservoir performance simulators. Work by others has included 18 separate contracts on a variety of technical and scientific projects. Altogether, 29 distinguishable research topics have been addressed. Fourteen institutions, including eight private companies, have interacted with the program. Table 1, along with figures 2 and 3 summarized the status of the work. (ERA citation 04:049832)

LBL-9462 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Review of LBL Geothermal Well Testing Equipment.
J. Haney, C. Goranson, R. Solbau, and R. Schroeder. Jul 79, 4p CONF-790906-11
Contract W-7405-ENG-48
Geothermal Resources Council annual meeting, Reno, NV, USA, 24 Sep 1979.

The high temperatures and hostile environments of geothermal reservoirs have prevented the use of high precision downhole well testing instrumentation. For the measurement of temperature, pressure, and flow at temperatures in excess of 150 exp 0 C, reservoir engineers have had to rely on less accurate non-electrical instrumentation. Sandia's development of high temperature electronics and the introduction of high temperature cable has now increased the temperature range of certain instruments utilizing downhole active electronics to 275 exp 0 C. However, this instrumentation is not yet commercially available. Development of high temperature instrumentation with moderate accuracy utilizing passive electronics downhole has only been limited by the non-availability of high temperature multi-conductor cable. With the recent introduction of 275 exp 0 C multi-conductor cable, the simultaneous measurement of moderate to high precision temperature, pressure, and flow is possible this year. The accurate measurement of two-phase flow at the surface will also soon be technically possible. The involvement of the LBL Geothermal Reservoir Engineering Group in the development and evaluation of geothermal well testing instrumentation is presented. (ERA citation 04:051356)

NP-23829 PC **A03**/MF **A01**
Kingston, Reynolds, Thom and Allardice Ltd., Auckland (New Zealand).
Mshiao 1 Drilling Report: Geothermal Exploration Project, Tongonan Leyte Philippines.
Aug 78, 32p
U.S. Sales Only.

Drilling of M1 was completed at 1946.8 m RKB total depth on 11 January 1977, a total of 82 days. M1 is the first of twenty projected geothermal exploration and development wells to be drilled. The drilling of the well and the initial completion tests performed prior to releasing the rig are covered. (ERA citation 04:049830)

ORO-5443-1 PC **A05**/MF **A01**
Texas Univ. at Austin. Center for Energy Studies.
Operation Research and Systems Analysis of Geothermal/Geopressured Resources in Texas. Final Report.
C. D. Zinn. Dec 77, 88p
Contract EG-77-S-05-5443

Preliminary geothermal/geopressured energy development scenarios for the state of Texas were prepared and analyzed. The overall objective of these projects is the formulation of a coordinated regional plan for the development of the geothermal/geopressured energy resources in the Texas/Louisiana region. Work accomplished, plans for the continuation of this planning support effort, and general conclusions and recommendations are included. Appendices contain additional detailed information related to the development scenarios. (ERA citation 04:051335)

SAN-1329-4 PC **A15**/MF **A01**
Desert Hot Springs, CA.
Direct Use Applications of Geothermal Resources at Desert Hot Springs, California. Final Report, May 23, 1977--July 31, 1978. Volume II: Appendixes.
C. C. Christiansen. Jul 78, 333p
Contract EG-77-C-03-1329

The following appendixes are included: Desert Hot Springs (DHS) Geothermal Project Advisory Board, Geothermal Citizens Advisory Committee, community needs assessment, geothermal resource characterization, a detailed discussion of the geothermal applications considered for DHS, space/water heating, agricultural operations, detailed analysis of a geothermal aquaculture facility, detailed discussion of proposed energy cascading systems for DHS, regulatory requirements, environmental impact assessment, resource management plan, and geothermal resources property rights and powers of cities to regulate indigenous geothermal resources and to finance construction of facilities for utilization of such resources. (ERA citation 04:049834)

SAN-1472-18 PC **A04**/MF **A01**
Gulf Research and Development Co., Pittsburgh, PA.
Underground Gasification for Steeply Dipping Coal Beds. Quarterly Progress Report, July 1--September 30, 1978.
Oct 78, 74p
Contract EF-77-C-03-1472

On-site (North Knobs, Wyoming) activities centered around geologic and hydrologic drilling and baseline environmental data acquisition. Design of an all-weather access road was completed and construction is pending. An accelerated burn schedule was planned and budget costs were revised to reflect this change. The Permit to Mine application has been finished and will be filed with the Wyoming Department of Environmental Quality early in October. Research on additional back-up sites continued. The Project Data Book (referred to in earlier documents as the Blue Book and the Test Design Criteria Handbook) format was refined and updated copies were issued. Offsite engineering activities included completion of the instrumentation system requirements and development of a preliminary layout of the site. (ERA citation 04:049443)

SAND-79-0878C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Logging Techniques Based on Dispersive Electrical Parameters.
P. C. Lysne. 1979, 13p CONF-790805-8
Contract EY-76-C-04-0789
DOE symposium on enhanced oil and gas recovery and improved drillings technology, Tulsa, OK, USA, 22 Aug 1979.

Electromagnetic techniques have often been successful for the production evaluation of oil and gas reservoirs. For example, direct current resistivity measurements yield production parameters such as the porosity through ancillary relations like Archie's Law. In another class of measurements, pulsed or sinusoidal electromagnetic fields are introduced into the formation. Then, the measured quantity is the electrical impedance which is dependent upon the dielectric constant and the magnetic permeability as well as the resistivity. Furthermore, these latter three independent electric parameters are often dispersive, that is they are frequency or time dependent. This fact has proven useful in induced polarization logging for sulfide mineralization and nuclear magnetic logging for fluid flow permeabilities. This paper considers the hopes and difficulties associated with the usage of dispersive electrical parameters as production parameter indicators in hydrocarbon reservoirs. The theory of dispersion in linear systems is well developed and is reviewed as it pertains to the constraints imposed on the electrical parameters. The formulation of the ancillary equations relating the electrical and production parameters is not well developed though vestiges of models are present and some of these are discussed. (ERA citation 04:049087)

UCRL-15032 PC **A10**/MF **A01**
GeoEnergy Corp., Las Vegas, NV.
Assessment of Non-Destructive Testing of Well Casing,, Cement and Cement Bond in High Temperature Wells.
, C. K. Knutson, and C. R. Boardman. 215p
Contract W-7405-ENG-48

Because of the difficulty in bringing geothermal well blowouts under control, any indication of a casing/cement problem should be expeditiously evaluated and solved. There are currently no high temperature cement bond and casing integrity logging systems for geothermal wells with maximum temperatures in excess of 500 exp 0 F. The market is currently insufficient to warrannt the private investment necessary to develop tools and cables capable of withstanding high temperatures. It is concluded that a DOE-funded development program is required to assure that diagnostic tools are available in the interim until geothermal resource development activities are of sufficient magnitude to support developmental work on high temperature casing/cement logging capabilities by industry. This program should be similar to and complement the current DOE program for development of reservoir evaluation logging capabilities for hot wells. The appendices contain annotated bibliographies on the following: high temperature logging in general, cement integrity testing, cosing integrity testing, casing and cement failures, and special and protective treatment techniques. Also included are composite listing of references in alphabetical order by senior author. (ERA citation 04:051361)

UCRL-82871 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Water-Related Impacts of Geothermal Energy Production in California's Imperial Valley.
D. W. Layton. 5 Jul 79, 8p CONF-790906-18
Contract W-7405-ENG-48
Geothermal Resources Council annual meeting, Reno, NV, USA, 24 Sep 1979.

To successfully develop the geothermal resources of the Imperial Valley, adequate supplies of cooling water must be obtained. The primary sources of water include waste waters from agricultural lands, condensate from flashed-steam facilities, and irrigation water. The major advantages and disadvantages of these supplies are examined and then the consequences of adopting six sets of water policies to support three scenarios of geothermal energy production are assessed. The assessment includes analyses of potential constraints to development as a result of restrictive water policies. It also includes predictions of changes in the Salton Sea's elevation and salinity caused by the consumption of agricultural drain water for cooling. (ERA citation 04:051370)

UCRL-83009 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Automated System for Membrane Filtration and Core Tests.
R. T. Hasbrouck, L. B. Owen, and R. Netherton.
2 Jul 79, 6p CONF-790906-16
Contract W-7405-ENG-48
Geothermal Resources Council annual meeting, Reno, NV, USA, 24 Sep 1979.

An existing manually operated LLL system for obtaining data on injectability of geothermal effluents has been automated. Membrane filters and core samples are exposed to geothermal brine at representative injection pressure and formation confining pressure to study the potential effects of scaling and suspended solids deposition on the performance of injection wells. An electronic controller provides for operation under conditions of either constant differential pressure or constant flow. A data logger is used to obtain continuous records of all major system parameters. The new system is being used to assess the injectability of effluents produced by Magma Power Company's reaction clarifier-filter preinjection treatment facility operated in conjunction with the Geothermal Loop Experimental Facility at the Salton Sea Geothermal Field, Southern California. (ERA citation 04:051372)

UCRL-83012 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.

Tidal Pressure Response as a Reservoir Engineering Tool.
J. M. Hanson. 10 Jul 79, 5p CONF-790906-10
Contract W-7405-ENG-48
Geothermal Resources Council annual meeting, Reno, NV, USA, 24 Sep 1979.

Fluid pressure oscillations resulting from tidal strain reflect hydrologic and elastic properties of a reservoir. Precise measurement and interpretation of these pressure fluctuations has the potential of being a useful quantitative reservoir engineering tool. Interpretations of reservoir response to tides have been to date of a qualitative nature. This is primarily due to the lack of resolving power of the spectral analysis techniques applied in the data interpretation. We have developed a procedure, based on the statistical nature of the noise in the signal, that overcomes most of these problems. The method quantifies the spectral resolution in terms of an absolute confidence level in both amplitude and phase of the spectral estimate. Analysis of one week of data from a well in the Salton Sea KGRA is presented. (ERA citation 04:051395)

UCRL-83013 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Computer Simulation of Temperature-Dependent Equilibrium Precipitation.
T. J. Wolery. 10 Jul 79, 4p CONF-790906-9
Contract W-7405-ENG-48
Geothermal Resources Council annual meeting, Reno, NV, USA, 24 Sep 1979.

The EQ3/EQ6 software package contains two computer codes (EQ3 and EQ6) and data files which form a useful tool in modeling precipitation from geothermal fluids caused by heating or cooling. The data files contain information on 140 aqueous species and nearly 150 minerals, and permit calculations over the temperature interval 0 to 350 exp 0 C. Assumption of homogeneous thermodynamic equilibrium in aqueous solution permits calculation of the driving forces for precipitation as measured by the affinity (log Q/K) for each such reaction. Further assumption of precipitation and heterogeneous equilibrium for any mineral whose affinity would otherwise exceed a value of zero permits determination of the identity of the precipitates, their masses and volumes, and the temperature ranges in which they form. The EQ3/EQ6 capability was used to determine the effects of temperature increase on formation of precipitates form Salton Sea water. (ERA citation 04:051391)

UT/CES-GR-1 PC **A04**/MF **A01**
Texas Univ. at Austin. Center for Energy Studies.
Geopressured Geothermal Resources of Texas: A Report on Legal Ownership and Royalty Issues.
A. W. Oberbeck. 27 Jan 77, 55p

Legal issues affecting ownership of the geopressured resources were examined. It was concluded that consideration of royalty interests indicates that the greatest promise for geothermal resource development would be offered if the geopressured resources were held to be entirely mineral in character. Further, the energy of the geopressured water should be held to be embraced by the standard term other minerals. (ERA citation 04:033081)

8J. Physical Oceanography

AD-A075 638/7 Not available NTIS
Saclant ASW Research Centre La Spezia (Italy)
Intensity-Range Relations for Shallow-Water Sound Propagation,
Edward Murphy , and Ole V. Olesen. 3 Jul 75, 11p Rept no. SACLANTCEN-SR-12
Availability: Pub. in Jnl. of Acoustical Society of America, v59 n2 p305-311 Feb 76 (No copies furnished by DTIC).

No abstract available.

AD-A075 672/6 Not available NTIS
Defence Research Establishment Pacific Victoria (British Columbia)
Estimates of Underwater Sound (and Infrasound) Produced by Nonlinearly Interacting Ocean Waves,
B. A. Hughes. 14 Jun 76, 9p Rept no. DREP-REPRINT-76-2
Availability: Pub. in Jnl. of the Acoustical Society of America, v60 n5 p1032-1039 Nov 76 (No copies furnished by DTIC).

No abstract available.

AD-A075 674/2 Not available NTIS
Saclant ASW Research Centre La Spezia (Italy)
Model for the Frequency Spread of Backscattered Underwater Sound Based on the Facet Model of the Rough Sea Surface,
Herward Schwarze. 2 Mar 76, 13p Rept no. SACLANTCEN-SR-26
Availability: Pub. in Jnl. of the Acoustical Society of America, v64 n2 p605-613 Aug 78 (No copies furnished by DTIC).

No abstract available.

AD-A075 742/7 PC **A03**/MF **A01**
Naval Underwater Systems Center New London Ct New London Lab
Volume Propagation Experiments at the Azores Fixed Acoustic Range.
Technical rept.,
Barry G. Buehler. 21 Sep 79, 37p Rept no. NUSC-TR-5785

Acoustic propagation over two purely refracted undersea paths is characterized by coherence lengths in the time, frequency, and space domains. Intensity fluctuations are quantified by the variance of log intensity. Measurements have been carried out on 1.5 and 18 nmi paths at the Azores Fixed Acoustic Range (AFAR) over the decade of acoustic frequencies from 500 to 5000 Hz. The 18 nmi path breaks up into 'micropaths,' resulting in self-interference of the deterministic ray. The long experiment averaging times, onsite oceanographic measurements, and repeatability of results make the results useful in the evaluation of acoustic propagation models. (Author)

AD-A075 833/4 PC **A07**/MF **A01**
Texas Univ At Austin Applied Research Labs
Laboratory and Field Studies of Sediment Acoustics.
Annual rept. 1 Jan-31 Dec 78,
Donald J. Shirley , David W. Bell , and Jens M. Hovem. 12 Jun 79, 137p Rept no. ARL-TR-79-26
Contract N00014-76-C-0117

Work under Contract consisted of three parts: (1) redesign and updating of the ARL:UT profilometer system used to measure in situ sound velocities of ocean bottom sediments, (2) development of transducers to measure shear wave and acoustic impedance parameters of sediments, and (3) laboratory measurements to develop and confirm theoretical models for acoustic propagation in sediments. Data obtained for the three parts of the program are reported.

AD-A075 898/7 PC **A03**/MF **A01**
Woods Hole Oceanographic Institution Mass
Late Pleistocene and Holocene Sedimentation in the Persian Gulf - Gulf of Oman.
Technical rept.,
P. Stoffers , and D. A. Ross. 14 Nov 78, 34p Rept nos. WHOI-79-74, WHOI-CONTRIB-4221
Contract N00014-74-C-0262, Grant NSF-OCE76-10417
Pub. in Sedimentary Geology, v23 p181-208 1979.

No abstract available.

AD-A075 900/1 PC **A02**/MF **A01**
Woods Hole Oceanographic Institution Mass
Sedimentary Processes on the Continental Slope of New England.
Technical rept.,
Joseph C. MacIlvaine , and David A. Ross. 8 Jul 77, 18p Rept nos. WHOI-79-66, WHOI-CONTRIB-3636
Contract N00014-66-C-0241
Pub. in Jnl. of Sedimentary Petrology, v49 n2 p0563-0574 Jun 79.

No abstract available.

AD-A075 901/9 PC **A02**/MF **A01**
Woods Hole Oceanographic Institution Mass
Ray Calculations of Ocean Sound Channels Using a Pocket Programmable Calculator and Extended Forms of the Hirsch-Carter Mathematical Model with Tables of the Incomplete Beta Function.
Technical rept.,
L. Baxter, II. Oct 79, 10p Rept nos. WHOI-79-57, WHOI-CONTRIB-4129
Contract N00014-74-C-0262
Pub. in Jnl. of the Acoustical Society of America, v65 n4 p1061-1065 Apr 79.

No abstract available.

AD-A076 167/6 MF **A01**
Calspan Corp Buffalo N Y
Oceanographic Data Bank Survey.
Final rept.,
W. E. Blum. 1 Dec 72, 139p Rept no. CALSPAN-VH-5216-S-1
Contract N00014-72-C-0466

This report summarizes the findings of an Oceanographic Data Bank Survey. The survey was conducted in order to eliminate duplication of data base development and to aid the Data Base Manager in establishing the data banks for the Acoustic Environmental Support Detachment (AESD). A key finding is that no one data bank exists that will satisfy the total needs of AESD. Data bases available from the National Oceanographic Data Center (NODC), Fleet Numerical Neather Central (FNWC) and the U. S. Naval Oceanographic Office (NAVOCEANO) will be required to construct the initial AESD environmental data banks. None of the agencies surveyed has achieved an interactive graphics capability that approaches the state of development that AESD will probably require. Some sources of data AESD might use to construct its environmental data banks are presented, and the advantages and disadvantages of each source are discussed. Methods of structuring the AESD environmental data banks for both near term and longer range use are discussed.

AD-A076 258/3 PC **A05**/MF **A01**
Battelle Memorial Inst Columbus Ohio Columbus Labs
Technical Assistance in Connection with Tektite I to Department of the Navy.
Summary rept.,
D. E. Adkins , and A. J. Coyle. 20 Aug 69, 79p
Contract N00014-70-C-0072

Tektite I was the first undersea program to be undertaken by a group of Federal agencies, in cooperation with private industry. Four marine scientists from the Department of the Interior lived for a period of 60 days, beginning February 15, 1969, in the Tektite I habitat on the ocean floor at a depth of about 50 feet. During this time the aquanauts breathed a nitrogen/oxygen gas mixture where the percentage of oxygen by volume was approximately equivalent to that at the surface. The site for this pioneering saturation dive was Great Lameshur Bay, St. John, Virgin Islands, chosen for its favorable climate, clear waters, and abundant undersea plant and animal life. The aquanauts lived in a marine laboratory, both on the ocean floor and in the habitat working spaces. This environment provided an unprecedented opportunity for intimate long-term marine investigations. While the scientists were conducting their underwater research mission, they were continuously observed by Navy and NASA behavioral and biomedical teams. Very complete psychological and physiological data were obtained identifying man's reactions to a long-term mission performed in an isolated, hostile environment common to both undersea and manned space missions. This report deals mainly with problem areas uncovered during the mission with habitat and support equipment hardware as well as with the evaluation of certain procedural items. No attempt has been made to describe the operation and functions of all the equipment discussed; this description has been left to those with original and ultimate responsibility in each area.

AD-A076 262/5 PC **A02**/MF **A01**
Sperry Rand Corp Great Neck Ny Sperry Systems Management
Seismic Profiling Systems.
Final rept.,
4 Apr 79, 18p Rept no. 2542.1579

Contract N00014-78-C-0208

A Seismic Profiling System was delivered on 30 January 1978 for temporary installation and operation aboard the NR-1. In order to have the equipment installed and tested in time for a planned mission, it was necessary to substitute an Edo Model 550A recorder in lieu of the final Model 615-2 recorder. The model 615-2 recorder was still in production at this time, but was subsequently delivered to the NR-1 and the Model 550A recorder was returned to the vendor. It has been reported that the seismic profiling equipment performed satisfactorily during the entire mission. The Model 615-2 recorder which has replaced the Model 550A recorder is more compact and mounts in the 2300 equipment rack, a considerable advantage over the unwieldy size of the latter recorder. The final equipment was delivered in accordance with the contract requirements.

LBL-9052 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Comparison of Nutrient Data from Four Potential OTEC Sites.
M. S. Quinby-Hunt. Jun 79, 8p CONF-790631-7
Contract W-7405-ENG-48
OTEC conference, Washington, DC, USA, 19 Jun 1979.

An in-progress assessment of nutrient chemical data (phosphate, nitrate, nitrite, and silicate) from four potential OTEC sites (Puerto Rico, the Gulf of Mexico, Hawaii, and the South Atlantic) show reasonable comparison with archival data. At this time sufficient data is available only at the Tampa site (Gulf of Mexico) to discern seasonal variations which show an influx of nutrient-rich water in February, which decreases with time to a minimum in December. Results show a greater potential for stimulation of primary productivity at the Hawaii site than in the northern Gulf of Mexico due to the discharge of the cold water pipe into the photic zone. (ERA citation 04:048328)

SAND-79-0868C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Development of in Situ Marine Seismic and Geotechnical Instrumentation Systems.
E. W. Reece. 1979, 18p CONF-790805-3
Contract EY-76-C-04-0789
DOE symposium on enhanced oil and gas recovery and improved drilling technology, Tulsa, OK, USA, 22 Aug 1979.

A unique pair of in situ marine geotechnical instrumentation systems, capable of operating unattended for extended periods of time in remote locations, were designed and fabricated, and are currently undergoing testing. The Seafloor Earthquake Measurement System (SEMS) measures the response of marine sediments to strong and moderate seismic activity. The Geotechnically Instrumented Seafloor Probe (GISP) measures the in situ pore pressure in soft marine clays. The two systems have many common characteristics. Both systems consist of two principal subsystems: a seafloor data gathering package and a shipboard command and recording package. The seafloor packages are totally self-contained, and incorporate microprocessor-based electronics which control data collection, processing, and storage. Data collected and stored by the seafloor packages are transmitted on command to the command and recording package by a high-data-rate acoustic telemetry system. This paper describes the design, development, and testing of the Seafloor Earthquake Measurement System and the Geotechnically Instrumented Seafloor Probe. Data are presented and discussed. Advanced concepts for future marine geotechnical instruments are discussed. 7 figures. (ERA citation 04:052246)

UCRL-82638(Rev.1) PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Plutonium in the North Equatorial Pacific.
V. E. Noshkin, and K. M. Wong. 15 May 79, 21p CONF-790382-1
Contract W-7405-ENG-48
Radionuclide/trace element cycling workshop, Gaithersburg, MD, USA, 7 Mar 1979.

The concentrations of plutonium in samples collected from the north equatorial region of the Pacific Ocean are presented. The results discussed in this abstract are preliminary, and some of the conclusions and descriptions of results may be revised after results from similar tests made by Woods Hole Oceanographic Institute are critically compared. An early exchange of these data is warranted because the results are directly related to the objectives of the workshop--to assess the processes, behavior, and fate of radionuclides in oceanic environments. (ERA citation 04:050596)

8K. Seismology

BMFT-FB-T-79-22 PC **A06**/MF **A01**
Preussag A.G. Erdoel und Erdgas, Hanover (Germany, F.R.).
Development of a Three-Dimensional Seismic Data Acquisition and Processing System.
J. Sattlegger. Jun 79, 115p
In German.
U.S. Sales Only.

Three-dimensional (areal) seismic methods available on the market assume a more or less regular recording geometry. Prospecting for tectonically more and more complex targets requires the feasibility of three-dimensional seismic surveys in densely populated areas as well. A regular recording geometry may not be maintained there. It was the objective of this project to develop a three-dimensional method as flexible as possible with regard to recording geometry. All algorithms developed under this project are based upon ray theory. The system of programs obtained allows to judge irregular recording geometries by computing characteristics, preprocessing, computation of residual static corrections, interpolation of traces in the points of a regular grid and the generation of true vertical sections by migration in case of an arbitrary, irregular recording geometry. This makes it possible to perform three-dimensional seismic surveys in topographicaly difficult and/or densely populated areas. Two surveys have been carried out to date. (ERA citation 04:052244)

DP-MS-78-95 PC **A02**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
In Situ Stress Field in the Southeastern United States and Its Implication.
D. E. Stephenson, and H. R. Pratt. 1979, 22p CONF-790497-2
Contract EY-76-C-09-0001
27. annual meeting of the Southeastern section of the Geological Society of America, Blacksburg, VA, USA, 26 Apr 1979.

Published and unpublished in situ stress measurements and studies of earthquake focal mechanisms in the southeastern United States are reviewed. These data, which provide information on the relative magnitude and orientation of existing stress fields, are analyzed in relation to the geologic characteristics of the Southeast and are compared with data for other areas in the United States. The relation of the stress fields to observed geology and present-day tectonic processes is reviewed. Stress measurements reveal the existence of high horizontal stresses in the Appalachian complex. Different in situ stress states in the Appalachian complex, the Coastal Plain, and the stable interior region indicate different faulting mechanisms. Various techniques for determining in situ stress are consistent. 6 figures, 1 table. (ERA citation 04:052242)

NUREG/CR-0998 PC **A04**/MF **A01**
Shannon and Wilson, Inc./Agbabian Associates, Seattle, WA.
Technical Manual: Operation and Equipment Instructions for In Situ Impulse Test.
Technical rept.
Nov 79, 74p
Contract NRC-04-76-200

This manual describes the test equipment and procedures for a new field test which determines the shear modulus of a soil deposit at strain levels equivalent to those experienced during actual earthquakes. Results from this test are typically used as input parameters to response analyses for evaluating local soil effects during earthquake shaking. The limitations of the test are also discussed.

UCRL-82636 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Regionalization of Ground Motion Attenuation in the Conterminous United States.
D. H. Chung, and D. L. Bernreuter. 13 Apr 79, 16p CONF-790831-1
Contract W-7405-ENG-48
U.S. National conference on earthquake engineering, Stanford, CA, USA, 22 Aug 1979.

Attenuation results from geometric spreading and from absorption. The former is almost independent of crustal geology or physiographic region. The latter depends strongly on crustal geology and the state of the earth's upper mantle. Except for very high-frequency waves, absorption does not affect ground motion at distances less than 25 to 50 km. Thus, in the near-field zone, the attenuation in the eastern United States will be similar to that in the western United States. Most of the differences in ground motion can be accounted for by differences in attenuation caused by differences in absorption. The other important factor is that for some Western earthquakes the fault breaks the earth's surface, resulting in larger ground motion. No Eastern earthquakes are known to have broken the earth's surface by faulting. The stress drop of Eastern earthquakes may be higher than for Western earthquakes of the same seismic moment, which would affect the high-frequency spectral content. This factor is believed to be of much less significance than differences in absorption in explaining the differences in ground motion between the East and the West. 6 figures. (ERA citation 04:049292)

8L. Snow, Ice, and Permafrost

AD-A075 839/1 Not available NTIS
Kansas Univ/Center for Research Inc Lawrence Remote Sensing Lab
Surface-Based Scatterometer Results of Arctic Sea Ice,
Robert G. Onstott , Richard K. Moore , and W. F. Weeks. 15 Jan 79, 8p
Contract N00014-74-C-1105
Availability: Pub. in IEEE Transactions on Geoscience Electronics, vGE-17 n3 p78-85 Jul 79 (No copies furnished by DTIC).

No abstract available.

AD-A076 213/8 PC **A02**/MF **A01**
Oulu Univ (Finland)
Laboratory Tests for Dynamic Ice-Structure Interaction.
Final rept. 13 Jun 78-20 Sep 79,
Mauri P. Maattanen. 20 Sep 79, 17p
Grant DA-ERO-78-G-090

The capabilities of the CRREL test basin to simulate dynamic ice-structure interaction with scale model tests cover the whole range of structures in question. For bottom-founded structure simulation, a test pile was designed so that its stiffness, natural frequencies and modes and damping could be varied. The ice movement against the pile was arranged to have constant acceleration in order to excite different modes with different ice velocities. The flexibility of drive system caused jerking ice movement with low velocities. Analysis of the recorded ice forces and acceleration include the refinement at measured ice forces by eliminating the response of the measuring system itself using dynamic equilibrium or transfer function approach. The frequency contents and the damping of vibrations are analysed using Fourier signal analyser. Scaling laws are discussed and it is observed that full similitude cannot be achieved for both ice interaction force and pile and ice vibrations. Results thus far show similitude with in-field ice force histograms: both random and saw-tooth like repetitious ice force fluctuations appear. The change from one interaction mode to the other with increasing drive velocities occurs. With high velocities relatively smooth random ice crushing occurs and in some cases natural modes are stable. The greatest energy content of ice forces does not always appear with the natural frequencies of structure. (Author)

AD-A076 229/4 Not available NTIS
Defence Research Establishment Ottawa (Ontario)

Oxygen Isotope Analysis in Accumulation Studies on an Ice Cap in Northern Ellesmere Island, NWT,
G. Hattersley-Smith , H. R. Krouse , and K. E. West. 1975, 6p Rept no. DREO-714
Abstract in French.
Availability: Pub. in Proceedings of the Snow and Ice Symposium Held in Moscow, Aug 71 (Actes du Neiges et Glaces Colloque de Moscou, Aout 71), IAHS-AISH Pub. No. 104 p123-128 1975 (No copies furnished by DTIC).

No abstract available.

8M. Soil Mechanics

PB80-102064 PC **A08**/MF **A01**
Radian Corp., Austin, TX.
Identifying Sources of Subsurface Nitrate Pollution with Stable Nitrogen Isotopes.
Final rept. Aug 76-Mar 78,
Timothy J. Wolterink, Hugh J. Williamson, David C. Jones, Thomas W. Grimshaw, and W. F. Holland. Aug 79, 163p RAD-78-200-155-15, EPA/600/4-79/050
Contract EPA-68-03-2450

This report describes the methods, results, conclusions, and recommendations of an investigation of a technique to identify sources of nitrate in ground water. A discussion of the theoretical basis of the technique is also provided. Over 300 soil and ground water samples were collected for this study. The samples are from numerous sites around the United States, representing a variety of environmental conditions. The nitrate in 66 of these samples was separated from other nitrogen species, converted to N2 gas, purified, and analyzed to determine the ratio (15)N/(14)N. These data were combined with the results of analyses performed previously by Jones (1) and Kreitler (2). Standard statistical techniques were used to analyze the observed variations in delta (15)N values, with respect to several nitrate sources and various environmental factors. It was found that nitrates from feedlots, barnyards and septic tanks can be distinguished from natural soil nitrates on the basis of their delta (15)N values. They cannot, however, be distinguished from each other. Environmental factors contributed to the observed variation in delta (15)N values.

9. ELECTRONICS AND ELECTRICAL ENGINEERING

9A. Components

AD-A075 645/2 Not available NTIS
Toronto Univ (Ontario) Dept of Electrical Engineering
Depletion M.O.S. Power Transistors,
B. Farzan , and C. A. T. Salama. 10 Oct 75, 2p
Availability: Pub. in Electronics Letters, v11 n23 2p, 13 Nov 75 (No copies furnished by DTIC).

No abstract available.

AD-A075 650/2 Not available NTIS
Toronto Univ (Ontario) Dept of Electrical Engineering
The Characteristics and Applications of a V-Shaped Notched-Channel Field-Effect Transistor (VFET),
T. D. Mok , and C. A. T. Salama. 2 Jun 75, 9p
Availability: Pub. in Solid-State Electronics, v19 n2-E p159-166 1976 (No copies furnished by DTIC).

No abstract available.

AD-A075 747/6 PC **A02**/MF **A01**
Naval Research Lab Washington Dc
Intense Ion Beam Generation with an Inverse Reflex Tetrode (IRT).
Memorandum rept.,
J. A. Pasour , R. A. Mahaffey , J. Golden , and C. A. Kapetanakos. 18 Oct 79, 14p Rept no. NRL-MR-4103

A new reflexing electron ion source is described. The device produces a unidirectional ion beam with relatively high efficiency even when the applied magnetic field exceeds the self field. This new source operates at a low, constant impedance during much of the applied voltage pulse and is better matched to available high-power, low impedance generators than previous reflexing electron devices. (Author)

AD-A075 755/9 Not available NTIS
Kentucky Univ Lexington
Distributed Bragg Reflector Gunn Oscillators for Dielectric Millimeter-Wave Integrated Circuits,
Tatsuo Itoh , and Fwu-Jih Hsu. 1 May 78, 5p
ARO-15465.7-EL
Grants DAAG29-77-G-0220, DAAG29-78-G-0145
Prepared in cooperation with Texas Univ., Austin. Dept. of Electrical Engineering and Anaconda Telecommunications, Anaheim, CA.
Availability: Pub. in IEEE Transactions on Microwave Theory and Techniques, vMTT-27 n5 p514-518 May 79 (No copies furnished by DTIC).

No abstract available.

AD-A075 761/7 PC **A08**/MF **A01**
FMC Corp San Jose Ca Ordnance Engineering Div
Manufacturing Methods Report. Static Switch.
Final process rept.
1976, 154p
Contract DAAH01-75-C-0552

This report covers all activity carried out under Contract NO. DAAHO1-75-C-0552, Manufacturing Techniques for Static Switches. The purpose of this contract was to improve the producibility and reliability of the present 2.75-inch rocket launcher intervalometer through the improvement of manufacturing methods and techniques brought about by: a Conversion of all timing functions to solid state circuits; b. Conversion of all switching functions to solid state circuits, c. Provision for the sensing and bypassing of any open or shorted squibs; d. Pilot production of five prototype solid state switches to verify the techniques chosen, and e. Design of an assembly line capable of producing 1000 switches per week. The contract has been concluded with all above tasks successfully accomplished. In addition, a reliability analysis of the solid state circuitry was conducted, an EMI analysis was made, and some EMI testing was done. A detailed investigation into the conversion of the electronic circuitry to one hybrid circuit chip was performed. All of these activities are documented in the report. (Author)

AD-A075 766/6 Not available NTIS
Manitoba Univ Winnipeg Dept of Electrical Engineering
Eigenvalues for a Trapezoidal Waveguide,
Magdy F. Iskander , and M. A. K. Hamid. 18 Feb 74, 4p
Availability: Pub. in The Radio and Electronic Engineer, v44 n11 p593-596 Nov 74 (No copies furnished by DTIC).

No abstract available.

AD-A075 776/5 PC **A02**/MF **A01**
Aerospace Corp El Segundo CA Lab Operations
Fabrication and Electrical Properties of Epitaxial PbTe Metal-Insulator-Semiconductor Structures.
Interim rept.,
P. H. Zimmermann , M. E. Mathews , and D. E. Joslin. 30 Aug 79, 23p TR-0079(4970-20)-1, SAMSO-TR-79-92
Contract F04701-78-C-0079

Methods for the fabrication of metal insulator semiconductor structures with the use of epitaxial PbTe films are described. These methods obviate the need for treating the semiconductor surface. They involve epitaxial film growth in a vacuum environment by hot-wall epitaxy followed by (1) deposition of ZrO2 without breaking vacuum and (2) deposition of pyrolytic SiO2. Capacitance-voltage characteristics in both cases closely correspond to theoretical values. Depletion layer generation is shown to be the dominant contribution to the inversion conductance. (Author)

AD-A075 875/5 PC **A06**/MF **A01**
Ohio State Univ Research Foundation Columbus Electron Tube Lab
Analysis of Magnetron Oscillations at Low Magnetic and Electric Fields.
Doctoral thesis,
John L. Moll. Jun 52, 116p WADC-TR-52-171
Contract W-33-038-ac-15162

Research was undertaken to investigate the possibility of operating a multicavity magnetron at values of electrical and magnetic field near the characteristic values. This would make possible the scaling of the magnetron to very short wavelengths before encountering difficulties with anode heating and magnetic field limitations. The essential change in design for low field operation is the use of a small cathode diameter. An account is given of a familiar theoretical concept of ordinary magnetron operation and this is related to the operation at low fields. Electron trajectories are calculated for low field conditions. The theoretical concept of low field operation is in general agreement with experimental results obtained at this laboratory. Experimental results are given for an 18 segment anode. It is essential that a cut-off curve be obtained to allow for low field oscillations. The violation of the Hull cut-off relation at high voltage places a limitation on the voltage at which it is possible to design low field magnetrons. (Author)

AD-A075 952/2 PC **A03**/MF **A01**
Watkins-Johnson Co Scotts Valley Ca
High Contrast CRT.
Interim technical rept. no. 3. 1 Jan-31 May 78,
Norman H. Lehrer , and Glenn A. Holmquist. Aug 79, 28p DELET-TR-77-2639-3
Contract DAAB07-77-C-2639

ERADCOM personnel successfully developed a method for sealing the 1720 glass faceplate to the 7052 funnel. The seal employs an intermediate region of uranium glass which is flame sealed to the funnel. Frit is used to seal the faceplate to the funnel. Two CRT's were successfully completed utilizing such a seal. Data taken on these tubes indicates a nominal peak line brightness of 10 fL in the red and 400 in the green at a writing speed of 5000 in/sec and a 60 hertz refresh rate.

AD-A075 953/0 PC **A02**/MF **A01**
Watkins-Johnson Co Scotts Valley Ca
High Contrast CRT.
Interim technical rept. no. 4, 1 Jun-30 Sep 78,
Glenn A. Holmquist. Aug 79, 24p DELET-TR-77-2639-4
Contract DAAB07-77-C-2639

Additional faceplates were fabricated; a third CRT was completed. The improved choice of glass components eliminates graded glass seals and yields a viable CRT as indicated by measured data. (Author)

AD-A076 005/8 PC **A02**/MF **A01**
Ohio State Univ Research Foundation Columbus Electron Tube Lab
Line Focus Guns.
Technical rept.,
C. J. Carter. Jun 52, 16p WADC-TR-52-172
Contract W-33-038-ac-15162

Research was undertaken in May 1951 to develop a high current density electron gun of the line-focus type. Two types have been developed. One design uses a single potential anode with an elliptical shaped cathode to concentrate the current into a narrow ribbon-like beam which is less than .040 inch wide. The second design uses a two potential gridded anode structure. The current is concentrated by a factor of 10 from the cathode to the narrowest part of the beam, where the current density is 1 ampere/sq.cm. (Author)

AD-A076 215/3 PC **A04**/MF **A01**
Thermal Technology Lab Inc Buffalo N Y
Development of Lightweight Transformers for Airborne High Power Supplies.
Final rept. Jul 76-Mar 79,
James P. Welsh. Jun 79, 69p AFAPL-TR-79-2049
Contract F33615-75-C-2014

Emphasis on this program was on the development of high voltage, high power, high frequency, low specific weight, inverter transformers. A primary intent was the reduction of specific weight without sacrifice of either electrical performance or reliability. Research was conducted into the characteristics of magnetic and dielectric materials, improved magnetic circuit modeling, and application

of advanced heat transfer techniques. Computer-aided design methods were utilized and specialized programs were developed to permit extensive manipulation of multiple design parameters.

AD-A076 235/1 PC **A03**/MF **A01**
Watkins-Johnson Co Scotts Valley Ca
High Contrast CRT.
Interim technical rept. no. 5, 1 Oct 78-28 Feb 79, Glenn A. Holmquist. Aug 79, 30p DELET-TR-77-2639-5
Contract DAAB07-77-C-2639

Sixteen faceplates were completed and characteristic optical data was recorded. The difficulties in production result from the properties of the faceplate glass limiting the maximum temperature of the La2O2S heat treatment. The optimum fabrication techniques, with this limitation, produced quality faceplates. (Author)

AD-A076 246/8 Not available NTIS
Mcgill Univ Montreal (Quebec) Dept of Electrical Engineering
On the Effective Permittivity Characterizing Electrical Coupling in Surface-Wave Devices,
A. H. Fahmy , and E. L. Adler. 16 Apr 73, 4p
Availability: Pub. in Jnl. of Applied Physics, v44 n9 p3949-3952 Sep 73 (No copies furnished by DTIC).

No abstract available.

AD-A076 279/9 Not available NTIS
Eidgenoessisches Militaerdepartement Bern (Switzerland) Gruppe Fuer Ruestungsdienste
Quantenstatistische Eigenschaften von Photodetektoren (Quantum-Statistical Properties of Photo Detectors).
Forschungsbericht,
U. Martens , and F. Kneubuehl. May 76, 6p
Text in German: References in English.
Availability: Pub. in Helvetica Physica Acta, v49 p796-799 1976 (No copies furnished by DTIC).

No abstract available.

BNL-26425 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
X-Ray Examination of Insulation in Lapped High Voltage Underground Power Transmission Cables.
A. C. Muller. 1979, 6p CONF-791008-1
Contract EY-76-C-02-0016
ASNT fall conference, St Louis, MO, USA, 15 Oct 1979.

The equipment and method used in a radiographic system for detecting defects in the electrical insulation on underground power transmission cables are described. The BNL x-ray system has been used to check the integrity of 230 kV paper-oil cables which have been in service in Arizona for several years and of a 345 kV paper-oil cable system in New York. This x-ray system can also be used for on-line quality control in cable factories. (ERA citation 04:051428)

CONS-3015-T2 PC **A02**/MF **A01**
Gould-Brown Boveri, Spring House, PA.
Superconducting Fault Current Limiter. Third Quarterly Technical Progress Report, February 8, 1979-May 7, 1979.
R. Eaton, Ill. 1979, 13p
Contract ET-78-C-01-3015

During the first two quarters of this program considerable effort was invested in determining performance objectives for superconducting fault current limiters (SCFCL) and deciding what would be the best design concept for a SCFCL device. This third quarter has been a period of starting new long-range programs based on the decisions made in the earlier quarters. Because of the long-term nature of these studies, there are no specific results yet to report. An investigation is now in progress to determine whether there is an advantage to using SCFCLs with superconducting generators and transformers. SCFCL performance objectives specifically for these applications will be established. A detailed device analysis of the magnetically-switched, resistive SCFCL has been started. The objective of this analysis will be to determine a complete device design, including size, shape, material and operating characteristics, for a typical set of performance specifications. An experimental facility is now being prepared to make key measurements of switching and thermal recovery speeds for the magnetically-switched, resistive concept. (ERA citation 04:053154)

CONS-3015-T3 PC **A06**/MF **A01**
Gould-Brown Boveri, Spring House, PA.
Superconducting Fault Current Limiter. Second Quarterly Technical Progress Report, November 8, 1978-February 7, 1979.
R. Eaton, Ill. 1979, 109p
Contract ET-78-C-01-3015

This study has three basic objectives: to determine the performance characteristics of superconducting fault current limiter (SCFCL's) from analyses of electric power systems; to evaluate the comparative advantages and disadvantages of the various classes of SCFCL devices; and to carry out key experiments which will determine the feasibility of the most promising type of SCFCL. During this quarter, significant progress was made on the first two objectives, and key experiments have been identified. Progress on these three objectives is described. (ERA citation 04:053155)

COO-5014-9 PC **A02**/MF **A01**
Wisconsin Univ., Madison.
Assessment of Research Directions for High Voltage Direct Current Power Systems. Quarterly Technical Progress Report, April 1, 1979-June 30, 1979.
W. F. Long. Aug 79, 11p
Contract ET-78-S-02-5014

This is an interim report covering hvdc circuit breaker development and recommended directions for research. It is a work-in-progress; for instance, the section entitled existing dc circuit breakers is being prepared by a graduate student under support from this project. Comments from key individuals are summarized. A brief outline of objectives and tasks for two projects concludes this report. (ERA citation 04:053153)

DOE/ET-2061-1 PC **A03**/MF **A01**
Westinghouse Electric Corp., Pittsburgh, PA. Advanced Systems Technology Div.
Study to Determine the Basic Insulation Level Requirements for a Prototype 1200 KV CGIT Cable System.
J. H. Cooper. Jul 79, 30p
Contract EX-76-C-01-2061

The required lightning impulse withstand characteristics of a prototype 1200 kV CGIT System were studied. It was assumed that lightning overvoltages would be introduced into the CGIT System due to lightning strokes which terminate on the overhead transmission system connected to the CGIT system. A detailed analysis of several proposed configurations for 1100 to 1200 kV transmission lines indicated that the most probable form of lightning overvoltage introduced into the CGIT System would be caused by shielding failures rather than blackflash occurrences. Following this conclusion, a single phase digital transient program was utilized to calculate the transient overvoltages which would appear within the CGIT System for system lengths of 600 ft, 2 miles, 10 miles, and 50 miles. Part of these simulations modeled surge arresters at both ends of a CGIT System representing a cable system interposed in an overhead line or a cable system terminating at an air-insulated substation. A second group of computer simulations modeled a surge arrester at one end only to represent the situation where a CGIT System terminates at a gas insulated station where the disconnects are opened and no arrester is applied within the gas insulation. Two types of surge arresters were modeled in this study: an arrester having protective characteristics extrapolated from present designs and ceramic oxide arresters. (ERA citation 04:054629)

EPRI-EL-905 PC **A07**/MF **A01**
Wisconsin Univ.-Madison. Dept. of Civil and Environmental Engineering.
Longitudinal Loading Tests on a Transmission Line. Final Report.
A. H. Peyrot. Sep 78, 145p

Full scale broken conductor and broken insulator tests have been conducted on an existing 138-kV line supported by steel lattice towers. The state-of-the-art for predicting peak dynamic longitudinal loads is reviewed and the full scale test results are compared with predicted values from currently available information. The dynamic response of the supporting towers was monitored to study possible amplification of the loads introduced at the cable or insulator attachment points. The transient phenomenon following a cable or insulator rupture is discussed, and a semi-empirical formula to predict impact factors is presented. (ERA citation 04:026271)

EPRI-RP-7810-1 PC **A07**/MF **A01**
General Cable Corp., Union, NJ.
Development of 500 KV AC Cable Employing Laminar Insulation of Other Than Conventional Cellulosic Paper. Final Report.
G. Bahder, G. S. Eager, Jr., J. J. Walker, and A. F. Dima. Aug 78, 133p
Contract EX-76-C-01-1426

Results are presented of an investigation to develop a 500 kV ac laminar dielectric power cable and joint having insulation with lower losses than conventional cellulosic paper insulation. Background information is presented on proposed low-loss synthetic and composite synthetic/cellulosic paper insulations and experiments covering a period of 20 years. Two types of insulations were chosen from these studies: fibrous polypropylene paper tape and cellulosic paper-polypropylene film-cellulosic paper composite paper (PPP). Extensive testing of hand-wrapped cable models fabricated with each type of tape served to eliminate from further consideration the fibrous polypropylene paper tape. Cable model tests indicate that the PPP tape is satisfactory for insulation in 500 kV ac cable, that oil impregnants now used in conventional cellulosic paper insulated cables are unsuitable for both types of the above insulation, but that silicone oil with an additive is satisfactory for PPP tapes. Laboratory data taken on three full-size factory-made prototype pipe-type cables and on a prototype joint indicate PPP insulation is suitable for 500 kV ac operation. Four final pipe-type cables having conventional moisture seal were manufactured for possible future field testing. The dielectric loss of the final cables is 1/5 that of conventional cellulosic paper insulated cables. The estimated installed cost per MVA-mile of the PPP insulated cable, neglecting the cost of losses, is higher than cellulosic insulated cables impregnated with conventional mineral oil. However, the reactance necessary to compensate for the cable charging current is significantly reduced. The design of a pipe-type cable and joint developed in this project and the PPP insulation structure are suitable for self-contained oil-filled cable systems rated 500 kV ac operating at reasonably high oil pressure. (ERA citation 04:054638)

N80-10436/7 PC **A03**/MF **A01**
Royal Aircraft Establishment, Farnborough (England).
Wear of Modified Electrical Brush Material in Vacuum.
M. Maillat, H. R. Kocher, and H. E. Hintermann.
Feb 79, 35p RAE-TRANS-2007, BR70073
Tran-Transl. Into English of Rept-980-2.1, Lab. Suisse de Recherches Horlogeres, Neuchatel, 15 Jan. 1978 35 p.

Friction tests were carried out in a high vacuum, without any electrical current, and in one position only, with respect to the structural orientation of the material on the electrical contacts. The wear is greater in the brushes with a composition of 84 Ag, 15 MOS2, 1 Cu by weight, than in the case of the brushes studied originally and it varies considerably from one sample to another.

ORNL/TM-6902 PC **A09**/MF **A01**
Oak Ridge National Lab., TN.
High Voltage Research (Breakdown Strengths of Gaseous and Liquid Insulators) and Environmental Effects of Dielectric Gases. Semiannual Report, October 1, 1978--March 31, 1979.
L. G. Christophorou, D. R. James, R. Y. Pai, R. A. Mathis, and I. Sauers. Jul 79, 177p
Contract W-7405-ENG-26

Progress in research on the breakdown strengths of gaseous dielectrics, on the environmental effects of gaseous dielectrics breakdown products,

and on measurements of breakdown voltages of liquid n-hexane are reported. A short discussion of transmission losses in EHV AC gas-insulated and oil-filled cable transmission lines is included. (ERA citation 04:051429)

PAT-APPL-6-051 934 PC **A02**/MF **A01**
Department of the Army Washington DC
Method of Making a Ruggedized High Current Density Cathode.
Patent Application,
Bernard Smith. Filed 25 Jun 79, 5p AD-D006 410/5
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A high current density cathode capable of operating at current densities of 2A/sq cm to 30A/sq cm in the temperature range of 900 degrees C to 1125 degrees C is prepared by machining a porous high purity tungsten pellet containing copper in its pores and also containing about 0.6 to 2 weight percent of an activator to the desired cathode shape without reducing the pores of the emitter pellet. The pellet is then fired at 1800 degrees C in a non-oxidizing atmosphere to remove the copper filler material. The pellet is then impregnated with the 8a5Sr(WO6)2 at a temperature of 1900 degrees C in a dry inert gas atmosphere and the impregnated emitter then fired in dry hydrogen atmosphere at about 1840 degrees C for about 2.5 to 5 minutes. (Author)

PATENT-3 123 692 Not available NTIS
National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
Fused Switch.
Patent,
G. J. Weber. Filed 6 Apr 60, patented 3 Mar 64, 3p N79-33393/6, PAT-APPL-20 370
Supersedes PAT-APPL-20 370-60. Subm-Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

An electric switch device is described which can be used safely even in an explosive environment. The switch has an operating arm, and a moveable actuator which is engaged by the arm and moved between a number of positions in which the arm opens or closes the switch. A fuse is slidably positioned in a passage through the actuator. The fuse can be replaced in the passage by another fuse when the actuator is in one of its many positions. The device is lightweight and compact, is capable of withstanding severe shock, and is not adversely affected by extremes of temperature.

PATENT-3 378 657 Not available NTIS
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
Calibrating Pressure Switch.
Patent,
N. J. Smith. Filed 4 May 66, patented 16 Apr 68, 5p N79-33392/8, PAT-APPL-547 643
Supersedes PAT-APPL-547 643-66. Subm-Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

A pressure switch assembly comprising a body portion and a switch mechanism having a contact element operable between opposite limit positions is described. A diaphragm chamber is provided in the body portion which mounts therein a system diaphragm and a calibration diaphragm which are of generally the same configuration and having outer faces conforming to the inner and outer walls of the diaphragm chamber. The space between the inner faces of the diaphragms defines a first chamber section and the space between the outer face of one of the diaphragms and the outer wall of the diaphragm chamber defines a second chamber section. The body portion includes a system pressure port communicating with one of the chamber sections and a calibration pressure port communicating with the other chamber section. An actuator connected to one of the diaphragms and the contact element of the switch operates upon pressure change in the diaphragm sections to move said contact element between limit positions.

PB80-104177 Not available NTIS
National Bureau of Standards, Washington, DC.
Limitations and Applications of the DC MOSFET Dopant Profile Method.
Final rept.,
M. G. Buehler. 1978, 12p
Sponsored in part by Defense Advanced Research Projects Agency, Arlington, VA., and Defense Nuclear Agency, Washington, DC.
Pub. in Paper in Semiconductor Characterization Techniques, 78-3, p241-252 1978.

Dopant profiles can be determined from dc measurements on a four terminal surface-channel MOSFET. The region from about three Debye lengths from the oxide-silicon interface to a maximum depth, limited by the avalanche breakdown in silicon, can be profiled by this method. Within three Debye lengths of the surface, the depletion approximation fails, and in this region the profile has a characteristic dip which is easily recognized. Other limitations include effects due to the field dependence of the channel mobility, short channel effects, and the lack of parallelism of the depletion edge with the interface. The method is illustrated by dopant profiles of bulk wafers, implanted layers, and a diffused layer. The dopant densities covered by these profiles vary from (6 x 10 to the 14th power/cu cm to 2 x 10 to the 18th power/cu cm).

SAND-79-0169C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Radiation-Induced Frequency Transients in AT, BT, and SC Cut Quartz Resonators.
D. R. Koehler. 1979, 21p CONF-790554-1
Contract EY-76-C-04-0789
33. annual symposium on frequency control, Atlantic City, NJ, USA, 30 May 1979.

Earlier studies of transient frequency changes in high-purity swept AT quartz resonators led to the conclusion that impurity-induced effects were small, while the observed changes were qualitatively and quantitatively well characterized in terms of the time changing temperature of the vibrating quartz and its effect on frequency. 5 MHz, AT cut fifth overtone, and BT and SC cut third overtone resonators were prepared from a single stone of Sawyer swept Premium-Q quartz. The resonators were operated in precision ovenized oscillators at or near their turnover temperatures. Pulsed irradiation, at dose levels of the order of 10 exp 4 rads (Si) per pulse, was accomplished at Sandia. The experimental data display negative frequency transients for the AT cut resonators, positive frequency transients for the BT cut resonators, and very small transient effects for the SC cut resonators. From these experimental results, it is concluded that no measurable impurity-induced frequency changes are observed in this high-purity swept-quartz and that the frequency transients are accurately modelled in terms of transient temperature effects stemming from the thermal characteristics of the resonator structure. (ERA citation 04:052022)

UCRL-15037 PC **A03**/MF **A01**
Hughes Aircraft Co., Culver City, CA.
Pulsed WIP Electron Gun. Final Report: Design Phase 1 X 70 cm Cooled WIP Electron Gun, 1 December 1978--2 February 1979.
G. Wakalopulos, and L. Gresko. 1979, 41p
Contract W-7405-ENG-48

Presented here are design criteria for a full scale (70 cm) WIP electron gun system capable of long run operation with the following specifications: foil area approx. 70 x 1 cm, electron beam current density approx. 1 A/cm exp 2 , pulse length < 200 ns FWHM, pulse tail < 25f f pulse energy, average current approx. 2 ma/cm exp 2 , voltage -150 kV, voltage droop < 10%, Rep rate approx. 10 KHz, power approx. 20 kW, run time approx. 30 min, and jitter approx. 10 mu s. (ERA citation 04:050545)

9B. Computers

AD-A075 661/9 PC **A02**/MF **A01**
Rensselaer Polytechnic Inst Troy Ny Dept of Electrical and Systems Engineering
Real-Time Signal Processing Using the Side-Entry Configuration of Surface Acousto-Optic Interaction.
Technical rept.,
F. M. Mohammed Ayub , and P. Das. Apr 79, 11p
Rept no. MA-ONR-27
Contract N00014-75-C-0772
Pub. in SPIE, v185 p110-117 1979.

No abstract available.

AD-A075 679/1 PC **A09**/MF **A01**
Science Applications Inc Englewood Co
Human Factors in Computer Systems: A Review of the Literature.
Technical rept. 1 Jun 76-31 Jul 79,
H. Rudy Ramsey , and Michael E. Atwood. 21 Sep 79, 180p Rept no. SAI-79-111-DEN
Contract N00014-76-C-0866

Based on an extensive literature survey, this document presents a description and critical analysis of the state of the art in the area of human factors in computer systems. This review is concerned both with the status of human factors research in the area of user computer interaction and with the current state of user-computer interaction technology and practices. The primary purpose of the review is to determine whether research and practice in this area have evolved sufficiently to support the development of a human factors guide to computer system design. It is concluded that insufficient data exist for the development of a 'quantitative reference handbook' in this area, but that a 'human factors design guide' -- which discusses issues, alternatives, and methods in the context of the design process -- is both feasible and needed. (Author)

AD-A075 803/7 PC **A04**/MF **A01**
California Univ Berkeley Electronics Research Lab
SOLVER: An Analytic Function Root Solving and Plotting Package.
Memorandum rept.,
H. Stephen Au-Yeung , and Alex Friedman. 31 Aug 79, 71p Rept no. UCB/ERL-M79/55
Contracts N00014-77-C-0578, DOE-DE-AS03-76SF00034

SOLVER is a root solver that provides automatic compilation, loading, and execution. It uses a simple version of Muller's method. SOLVER is intended for the occasional user who needs roots but balks at learning to use sophisticated but complicated solvers, which usually also require considerable additional programming. The user need only supply the function to be set to zero and the number of solutions desired. SOLVER is available on the CRAY-1 computer.

AD-A075 824/3 PC **A02**/MF **A01**
California Univ Los Angeles
On the User-Requisite Variety of Computer Application Software.
Technical rept.,
E. Burton Swanson. 1 Dec 78, 7p
Contract N00014-75-C-0266
Pub. in IEEE Transactions on Reliability, vR-28 n3 p221-226 Aug 79.

No abstract available.

AD-A075 912/6 PC **A02**/MF **A01**
Walter Reed Army Inst of Research Washington Dc
An Off-Line Image Processing System for Digital Display in Computed Tomography,
L. E. Larsen , and R. A. Evans. 1977, 9p
Pub. in Radiology, v123 no. 2 p361-367 May 77. Presented at the Scientific Assembly (61st) and Annual Meeting of the Radiological Society of North America, Chicago, IL on 30 Nov-5 Dec 75.

No abstract available.

AD-A075 948/0 PC **A04**/MF **A01**
Defense Advanced Research Projects Agency Arlington Va
Defense Computer Resources Technology Plan.
2nd. edition.
Jun 79, 69p
See also Appendix D, AD-B041 666L.

This plan is the result of four years of intensive analysis and evaluation to determine the causes of

DoD computer resources problems and to define a comprehensive R and D program to solve them. It addresses technology needs and opportunities for the computers embedded in major weapons systems--for example, those that guide missiles to their targets, aim guns, control and process the data from radars and other sensor systems, and control high-performance airplanes, some of which are inherently unstable and impossible to control without computer assistance. The rate of progress in integrated circuits and computer technology is startling. Fifteen years ago, all computers were large and expensive. Today, powerful computers for home use cost only a few hundred dollars, and hand calculators cost as little as five dollars. With Very Large Scale Integrated Circuit technology, advanced computers will cost as little as $5 or $10; every home will have several of them, embedded in everything from washing machines to children's toys. Flexible computer-controlled communications systems and large-scale command and control systems with sophisticated decision aids will make it possible to coordinate the actions of globally dispersed forces and achieve a concentration of resources unprecedented in the history of warfare.

AD-A076 019/9 PC **A06**/MF **A01**
General Research Corp Mclean Va Operations Analysis Group
Analysis to Determine Functional and Systems Requirements for an On-Line Structure and Composition System (SACS). Report of Task G Near- and Long-Term Improvements.
Final rept. for period ending Aug 79,
Francis O. Deppner , John J. Anderson , and Whitney C. Scully. Sep 79, 121p Rept no. GRC-1070-06-79-CR
Contract MDA903-78-C-0445

This report identifies the specific improvement actions required to bring an improved on-line SACS to fruition. The actions have been further broken into subtasks, dependency relationships have been established, and tasks have been identified as being either near-term (1-12 months) or long-term (up to 32 months). The report also contains a network schematic which portrays the sequence in which the SACS improvement work should be accomplished during the full 32 months of effort. (Author)

AD-A076 062/9 PC **A02**/MF **A01**
Maryland Univ College Park Computer Science Center
The Simplest 'Hueckel' Edge Detector is a Roberts Operator.
Technical rept.,
Azriel Rosenfeld. Mar 79, 12p Rept no. CSC-TR-747
Contract DAAG53-76-C-0138, DARPA Order-3206

Hueckel's edge detector finds the best-fitting ideal step edge to a given picture neighborhood, by expanding the neighborhood and step edge in terms of a set of nine basis functions. The simplest case of this approach uses a 2-by-2 neighborhood and three basis functions. This case is solved explicitly using elementary methods. The magnitude of the best-fitting step edge for the neighborhood AB over CD turns out to be the Roberts operator max (abs. val. (A-D), abs. val. (B-C)). (Author)

AD-A076 063/7 PC **A03**/MF **A01**
Maryland Univ College Park Computer Science Center
A Comparison of Noise Cleaning Techniques for Color Images.
Technical rept.,
Azriel Rosenfeld , and Judith P. Davenport. Apr 79, 39p Rept no. CSC-TR-748
Contract DAAG53-76-C-0138, DARPA Order-3206

An earlier report compared a number of iterative local noise cleaning techniques as applied to grayscale images. The present report provides some additional discussion of the grayscale results, and also applies several of the better methods to a color image of a house. Noise cleaning on each individual color component is compared with noise cleaning on the color vectors themselves. Results for two color coordinate systems, RGB and UVW, are also compared. (Author)

AD-A076 064/5 PC **A02**/MF **A01**
Maryland Univ College Park Computer Science Center
Thresholding Using the ISODATA Clustering Algorithm.
Technical rept.,
Flavio R. D. Velasco . Mar 79, 14p Rept no. CSC-TR-751
Contract DAAG53-76-C-0138, DARPA Order-3206

A recently proposed iterative thresholding scheme turns out to be essentially the well-known ISODATA clustering algorithm, applied to a one-dimensional feature space (the sole feature of a pixel is its gray level). We prove that in one dimension, ISODATA always converges. We also apply it to requantize images into specified numbers of gray levels. (Author)

AD-A076 109/8 PC **A03**/MF **A01**
Army Engineer Topographic Labs Fort Belvoir Va
Fourier Transform Autocorrelation.
Research note,
Michael M. McDonnell. Apr 79, 36p Rept no. ETL-0184

This report describes a device which can take a complete Fourier transform of the intensity transmittance of a photographic transparency. The transform is taken by purely optical means. A complete system analysis is presented, and some results of experiments with the device are described. (Author)

AD-A076 111/4 PC **A03**/MF **A01**
Army Engineer Topographic Labs Fort Belvoir Va
An Evaluation of Conventional Correlation Methods When Matching Infrared Imagery to Panchromatic Imagery.
Research note,
Michael A. Crombie. Aug 79, 36p Rept no. ETL-0195

In this report, a practical method of determining parallax by matching an infrared image to a corresponding panchromatic image using conventional correlation methods is evaluated using digitized aerial images. However, from the results of the study, the method was found to be unsatisfactory. (Author)

AD-A076 112/2 PC **A02**/MF **A01**
Army Engineer Topographic Labs Fort Belvoir Va
A Weighted Line-Finding Algorithm.
Research note,
K. Abdoshah , and A. Klinger. Sep 79, 24p Rept no. ETL-0200

This paper introduces two new algorithms to detect a line in a digitized picture. The algorithms are compared with the Hough algorithm, and their computational advantages are shown. We discuss the potential for, and the use of, the algorithms in applications, including the use of imagery in digital cartography. (Author)

AD-A076 130/4 PC **A03**/MF **A01**
Maryland Univ College Park Computer Science Center
Connected Component Labeling Using Quadtrees.
Technical rept.,
Hanan Samet. Apr 79, 30p Rept no. CSC-TR-756
Contract DAAG53-76-C-0138, DARPA Order-3206

An algorithm is presented for labeling the connected components of an image represented by a quadtree. The algorithm proceeds by exploring all possible adjacencies for each node once and only once. Once this is done, any equivalences generated by the adjacency labeling phase are propagated. Analysis of the algorithm reveals that its worst case average execution time is bounded by a quantity proportional to the product of the log of the region's diameter and the number of blocks comprising the area connected by the components. (Author)

AD-A076 139/5 PC **A03**/MF **A01**
Electronics Research Lab Adelaide (Australia)
Management Procedures for Controlling Data Storage on the IBM System 370 Computer at DRCS.
Technical rept.,
J. C. Gwatking , and R. W. Collier. Jan 79, 34p Rept no. ERL-0055-TR

This document is one of a series describing various aspects of data management on the DRCS Central Computer. It includes methods for controlling user datasets on both disk and magnetic tape. Where appropriate the operating procedures and supporting software are also outlined. (Author)

AD-A076 148/6 PC **A18**/MF **A01**
Logical Technical Services Corp Vienna Va
Automatic Feature Extraction: An Annotated Bibliography.
Contract rept. 28 Sep 78-30 May 79.
May 79, 410p ETL-0189
Contract DAAK70-78-C-0195

An annotated bibliography was prepared, consisting of reports, papers, articles, proceedings, and significant collections dealing with Automatic Feature Extraction from continuous tone imagery, in order to meet the research and operational needs of workers responsible for topographic mapping and preparation of military geographic information (MGI). A listing of forty-two key words was compiled for the bibliographic search, which was limited to unclassified work conducted in the United States and abroad from 1970 to the present. Twenty-one data bases were searched, as well as other pertinent bibliographic references. Some 12,000 to 15,000 abstracts were obtained, examined, and culled. The abstracts were supplied by the author(s) or by data base editors; some abstracts were edited by project personnel for clarity or to achieve a manageable text length. The bibliographic entries are categorized in a separate index according to the specific techniques and methods being reported. The rationale for the categorization is explained. A personal author index is supplied. Collections are excluded from the author and category indexes, since the scope of this material does not lend itself to categorization. (Author)

AD-A076 210/4 PC **A05**/MF **A01**
Assistant Chief of Staff Studies and Analysis (Air Force) Washington D C
Computer Models Used by the Assistant Chief of Staff Studies and Analyses, Headquarters United States Air Force (AF/SA).
Aug 79, 90p

The purpose of this document is to provide a listing of computer simulation models used by Headquarters USAF Studies and Analyses. The ACS Studies and Analyses provides to the Air Force and DOD timely illumination and visibility of the force structure issues which bear on defense posture readiness decisions. Ultimately, illumination of such issues provides the basis for DOD decisions today regarding the allocation of money and other resources for national defense force structures of the future. Computer simulation modeling is one of the analytical techniques used by the analyst to gain insight into the the myriad of detailed relationships effecting force structure and force readiness decisions.

AD-A076 283/1 PC **A05**/MF **A01**
Utah Univ Salt Lake City Systems Research Lab
Development and Evaluation of Software Reliability Estimators,
Jacob Tal. 31 Dec 76, 100p Rept nos. SRL-76-3, UTEC-SR-77-013
Contract F42600-76-C-0315

This study considers the problem of estimating the number of errors in a software package and its mean time-to-failure (mttf). An emphasis is placed on the comparison and evaluation of various estimators and on determining the estimator accuracy.

AD-A076 289/8 PC **A02**/MF **A01**
Louisiana State Univ Baton Rouge Dept of Electrical Engineering
Synthesising Cluster Operators,
William A. Porter. 8 Aug 78, 8p AFOSR-TR-79-1001
Grant AFOSR-78-3500
Pub. in Pattern Recognition, v11 p127-132 1979.

No abstract available.

AD-A076 294/8 PC **A02**/MF **A01**
Rensselaer Polytechnic Inst Troy Ny Dept of Electrical and Systems Engineering

The Cyclic Order Property of Vertices as an Aid in Scene Analysis,
R. Shapira , and H. Freeman. 1979, 9p AFOSR-TR-79-1017
Grant AFOSR-76-2937
Pub. in Communications of the ACM, v22 n6 p368-375 Jun 79.

No abstract available.

AD-A076 300/3 PC **A03**/MF **A01**
Colorado Univ Boulder Dept of Computer Science
'Using Data Flow Tools in Software Engineering'.
Interim technical rept.,
Leon J. Osterweil. Mar 79, 45p CU-CS-153-79, ARO-15074.6-M
Grants DAAG29-78-G-0046, NSF-MCS77-02194

In this paper we propose a generic configuration of tool capabilities. We categorize many of the available tools into a few broad classes, and show how these classes have properties which are nicely complementary. We hypothesize that testing, documentation and verification are three of the most important software production activities and suggest that these activities can be nicely supported by different configurations of representatives of these few tool classes.

AD-A076 335/9 PC **A02**/MF **A01**
Colorado Univ Boulder Dept of Computer Science
A Software Lifecycle Methodology and Tool Support.
Interim technical rept.,
Leon J. Osterweil. Apr 79, 20p CU-CS-154-79, ARO-15074.5-M
Grants DAAG29-78-G-0046, NSF-MCS77-02194

This paper describes a system of techniques and tools for aiding in the development and maintenance of software. Improved verification techniques are applied throughout the entire process and management visibility is greatly enhanced. The paper discusses the critical need for improving upon past and present methodology. It presents a proposal for a new production methodology, a verification methodology, and the system architecture for a family of support tools. (Author)

AD-A076 342/5 PC **A09**/MF **A01**
IBM Federal Systems Div Gaithersburg Md
Interactive Digital Image Processing Investigation.
Final rept.,
W. C. Rice , J. S. Shipman , and R. J. Spieler. 29 Dec 78, 185p ETL-0172
Contract DAAK70-77-C-0166

The objective of this investigation was to develop an interactive software package of general utility that can be used to support experiments and evaluate a class of interactive/automatic digital techniques whose goal is feature extraction/exploitation. The initial task was to survey and select techniques, algorithms and supporting functions that were to be included in the system. A maximum likelihood supervised classification algorithm, and an unsupervised classification (clustering) method. These and the associated support and evaluation functions were developed and implemented on the Digital Image Analysis Laboratory. Testing of the system was accomplished by performing experiments on areas for which both multi-dimensional images and ground truth were available. Analysis of experimental results validated the system. These experimental results were in good agreement with ground truth and further, supervised and unsupervised classification results were in substantial agreement. This report describes the data processing algorithms/techniques, software system, user guide information, and the experiment procedures used along with their results.

CEA-N-2032 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Physique des Particules Elementaires.
Electronic LAM GRADER.
J. C. Raoul. Apr 78, 8p
In French.
U.S. Sales Only.

The electronic LAM GRADER is a 1/25 width CAMAC module intended for use with the CCA crate controller specified in EUR 4600. The input to the LAM GRADER is a 23 bit pattern coming from CCA and representing the 23 L lines of the crate. The output is a 24 bit pattern which is the result of the grading process inside the LAM GRADER. The grading process is programmed. This module may be plugged in any one of the 23 module positions of a crate. (Atomindex citation 10:449856)

CEA-N-2033 PC **A04**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Physique des Particules Elementaires.
CAMAC/PDP 11-45 Coupler.
J. Pascual, and J. C. Raoul. Apr 78, 55p
In French.
U.S. Sales Only.

The complex experimental devices used in high energy physics require the use of minicomputers. The latter are coupled to the detectors using the CAMAC standard which has been adopted by the majority of high energy physics laboratories, much to the ease of international collaboration. The performance of industrially available interfaces having shown to be inadequate, the DPhPE has undertaken the development of a multibranche CAMAC/PDP 11-45 coupler. This system can control up to 49 crates shared out between 7 branches. It consists of a programmed channel and up to three high speed (556 Kwords/second) automatic channels. The four channels can work simultaneously through time sharing. The coupler includes a LAM handling system. The correspondent software has been developed simultaneously: the monitor is an extended version of the RT 11 system supplied by the manufacturer. This interface has been used so far in five experiments on the CERN PS and SPS. Besides this publication, intended to give a description of the coupler, a user's utilisation manual exists in English. (Atomindex citation 10:449849)

CONF-781052-2 PC **A02**/MF **A01**
Argonne National Lab., IL.
Programmable Formatting of Program Text: Experiences Drawn from the TAMPR System.
K. W. Dritz. 1978, 4p
Contract W-31-109-ENG-38
ACM-SIGNUM conference on the programming environment for development of numerical software, Pasadena, CA, USA, 16 Oct 1978.

The TAMPR System originated as an approach to the problem of automating the routine modifications of Fortran source programs required to adapt them to a variety of uses or environments. Overall, the system accomplishes such modifications by applying transformations to Fortran programs at the source level. Three steps are involved: a Fortran source program is processed by the TAMPR Recognizer to yield essentially a parse tree called the abstract form; the Transformation Interpreter applies intragrammatical transformations to the abstract form as tree operations; the abstract form is then reconverted to source program form by the Formatter. By ensuring that the transformations are applied only to the correct syntactic entities and only in the intended contexts, the use of the abstract form greatly simplifies establishing the reliability of the overall process. The Formatter, of course, is responsible for meeting the requirements of the target language, such as use of blanks, statement continuations, etc. In addition, the formatting process is charged with imparting to the resultant program a certain degree of style. Areas of concern here are spacing between symbols, choosing logical breakpoints in multi-line statements, and, at a higher level, commenting and indentation to help reveal program structure. The Formatter was designed to interpret an easily modified set of formatting instructions. (ERA citation 04:028606)

COO-2383-0059 PC **A03**/MF **A01**
Illinois Univ. at Urbana-Champaign. Dept. of Computer Science.
Numerical Software: Science or Alchemy.
C. W. Gear. Jun 79, 27p UIUCDCS-R-79-969, UILU-ENG-79-1715
Contract EY-76-S-02-2383

This is a summary of the Forsythe lecture presented at the Computer Science Conference, Dayton, Ohio, in February 1979. It examines the activity called Numerical Software, first to see what distinguishes numerical software from any other form of software and why numerical software is so much more difficult. Then it examines the scientific basis of such software and discusses that is lacking in that basis. (ERA citation 04:052400)

DP-MS-79-38 PC **A02**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Microcomputers for Nuclear Instrumentation.
J. S. Byrd. 1979, 17p CONF-790577-1
Contract EY-76-C-09-0001
Conference and exhibits on small computers session on applications in engineering and science, Clemson, SC, USA, 23 May 1979.

Small, desk-top Commodore PET computers are being used to solve nuclear instrumentation problems at the Savannah River Laboratory (SRL). The ease of operating, programing, interfacing, and maintaining the PET computer makes it a cost-effective solution to many real-time instrumentation problems that involve both data acquisition and date processing. The IEEE-488 GPIB (General Purpose Instrument Bus) is an integral part of the PET hardware. This paper reviews GPIB design concepts and discusses SRL applications that use the PET computer as a GPIB controller. 11 figures, 2 tables. (ERA citation 04:052106)

HMI-B-275 PC **A02**/MF **A01**
Hahn-Meitner-Inst. fuer Kernforschung Berlin G.m.b.H. (Germany, F.R.). Bereich Datenverarbeitung und Elektronik.
Data-Link of Autonomous CAMAC Processor Systems with a Computer.
W. Brehmer. Aug 78, 20p
In German.
U.S. Sales Only.

Employing CAMAC processor systems, a data-link, connecting the processor system and a host-computer, is often required. The functions for the data-link has been defined. The implementation of the data-link between a DEC-Computer PDP 11/4phi and an INCAA CAMAC processor system CAPRO-1 is described. The data-link includes procedures for dialog and data transfer integrated into the executive of the processor system CAPRO-1. (Atomindex citation 10:449902)

IFVE-OEIPK-78-6 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Computer Graphics Software for Physical Experiments.
L. G. Kaminskii, S. V. Klimenko, V. N. Kochin, and A. A. Lebedev. 1978, 16p
In Russian.
U.S. Sales Only.

The computer graphics software for scientific researches carried out at IHEP has been described. The structure of the software packages for storage displays and plotters has been discussed. The system developed has been successfully used in a number of high energy physics experiments. Experience, efficiency and simplicity in usage confirm validity of the system structure choice and implementation methods. (Atomindex citation 10:450206)

IPNO-77-06 PC **A05**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
Recent Progresses in Great Capacity Peripheral Memories.
J. P. Reuter. 1977, 76p
In French.
U.S. Sales Only.

Main points approached are recent developments in magnetic memories (tapes and disks) and optical memories (holographic and electron beam access); a detailed study is made on new technologies such as charge coupled devices (CCD) and magnetic bubbles memories. A comparison between these different systems is made, as well as forecasting trends of evolution. (Atomindex citation 10:449932)

LA-UR-79-1826 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.

CAD/CAM in the LASL Shop Department.
E. W. Colston. 1979, 25p CONF-7904101-1
Contract W-7405-ENG-36
IMOG machine tool subgroup meeting, Los Alamos, NM, USA, 10 Apr 1979.

Manufacturing and Consulting Services, Inc. AD-2000 Interactive Graphics software is used on an Interdata 7/32 computer system. The arrangement of the system is described. Capabilities of the system are illustrated by a number of figures taken from the graphics terminal screen. 21 figures. (ERA citation 04:055345)

NUREG/CR-0963 PC **A05**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
DYNEST1 - A Revised Dynamic Estimator Calculation Program,
D. W. Freeman, and J. V. Candy. Nov 79, 94p
UCRL-52721

This report is a user's guide for the DYNEST1 computer code (DYNamic ESTimator, revision 1). DYNEST1 is a program developed at Lawrence Livermore Laboratory to calculate state estimates of a (nonlinear or linear) dynamic system from noisy measurement data. The estimates, their corresponding errors, and diagnostic data are presented primarily in graphical form, but numeric output data are also generated. DYNEST1 implements three sophisticated on-line state estimation algorithms: the extended Kalman filter, the iterated extended Kalman filter, and the linearized Kalman filter. Program modularity facilitates interfacing of user-supplied subroutines. The versatile integration package enables the user to calculate state estimates and associated errors at or between measurement times. A feature is provided to calculate the Cramer-Rao bound for linear and linearized systems. New features of this revision include the addition of several new diagnostic tools: a model-check capability, tracking-error plotting, and closed-loop pole calculations. Other changes include extensive revision of input protocol and the optional generation of steady-state output and detector input files. The required input, method of program execution, and the resulting graphical output are presented.

N80-10813/7 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Washington, D. C.
Beysik: Language Description and Handbook for Programmers (System for the Collective Use of the Institute of Space Research, Academy of Sciences USSR).
I. G. Orlov. Oct 79, 42p NASA-TM-75680, PR-476
Contract NASW-3198
Tran-Transl. Into English of Beysik. Opisaniye Nazika I Rukovodstvo Dlya Programmista (Sistema Kollektivnogo Polizovaniya Iki an Sssr) (Moscow), PR-476, 1979 42 p. Subm-Transl. By Scientific Translation Service, Santa Barbara, Calif. Original DOC. Prep. By Academy of Sciences (Ussr), Moscow.

The BASIC algorithmic language is described, and a guide is presented for the programmer using the language interpreter. The high-level algorithm BASIC is a problem-oriented programming language intended for solution of computational and engineering problems.

N80-10854/1 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
Application of Queueing Models to Multiprogrammed Computer Systems Operating in a Time-Critical Environment.
D. E. Eckhardt, Jr.. Oct 79, 22p NASA-TM-80143, L-13209

A model of a central processor (CPU) which services background applications in the presence of time critical activity is presented. The CPU is viewed as an M/M/1 queueing system subject to periodic interrupts by deterministic, time critical process. The Laplace transform of the distribution of service times for the background applications is developed. The use of state of the art queueing models for studying the background processing capability of time critical computer systems is discussed and the results of a model validation study which support this application of queueing models are presented.

PATENT-4 164 023 PC **A02**/MF **A01**
Department of the Navy Washington DC
Permutation Memories.
Patent,
Harper J. Whitehouse, and Jeffrey M. Speiser.
Filed 22 Sep 77, patented 7 Aug 79, 9p AD-D006 434/5, PAT-APPL-835 765
Supersedes PAT-APPL-835 765-77.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A permutation memory comprises an input control means for decoding, having a plurality L of inputs for an L-bit binary number, and a plurality 2 superscript L of outputs. Means are connected to the decoding means, for initiating the read-in of the L-bit number. Means are provided for applying an input signal. A first plurality of 2 superscript L of normally open switching means are connected to the 2 superscript L outputs of the decoding means and to the signal applying means. A plurality of 2 superscript L of means are connected to the switching means, for storing a charge when a specific switching means, connected to a corresponding charge storing means, is in a closed condition. A second plurality 2 superscript L of switching means are connected to the first plurality of switching means and to the charge storing means. An output control means, connected to the second plurality of switching means, reads out the states of the 2 superscript L charge-storing means, as to the amount of charge in each. Means are connected to the read-out means, for initiating the read-out. (Author)

PB80-801632 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Data Compression (Citations from the NTIS Data Base).
Rept. for 1964-Nov 79,
Brian Carrigan. Dec 79, 243p
Supersedes NTIS/PS-78/1247, NTIS/PS-77/1129, NTIS/PS-76/0995, NTIS/PS-75/860, and NTIS/PS-75/067. For the companion Published Search of the Engineering Index Data Base, see PB80-801640 and PB80-801657.

The bibliography cites Government-sponsored research studies on techniques and equipment for data compression. Reports are included on video communications, telemetry, voice communications, data management, and computer storage devices. (This updated bibliography contains 234 abstracts, 16 of which are new entries to the previous edition.)

PB80-801657 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Data Compression. Volume 2. 1978-November, 1979 (Citations from the Engineering Index Data Base).
Rept. for 1978-Nov 79,
Brian Carrigan. Dec 79, 97p
Supersedes NTIS/PS-78/1248, NTIS/PS-77/1130, and NTIS/PS-76/0996. For the companion Published Search of the NTIS Data Base, see PB80-801632.

The bibliography of worldwide journal literature cites research on techniques and equipment for data compression. Reports on video communications, data management, and computer storage devices are included. (This updated bibliography contains 90 abstracts, 58 of which are new entries to the previous edition.)

PB80-802085 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Computer Performance Evaluation (A Bibliography with Abstracts).
Rept. for 1970-Nov 79,
Brian Carrigan. Dec 79, 251p
Supersedes NTIS/PS-78/1078, NTIS/PS-77/0938, NTIS/PS-76/0830, NTIS/PS-75/753, and NTIS/PS-75/063.

The bibliography cites research on the measurement of computer systems effectiveness. It includes studies on workload determination, computational efficiency, and techniques for performance evaluation of both hardware and software. (This updated bibliography contains 268 abstracts, 79 of which are new entries to the previous edition.)

SAND-79-0603C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
High-Speed Nonvolatile CMOS/MNOS RAM.
G. F. Derbenwick, W. D. Dodson, and R. J. Sokel. 1979, 3p CONF-790809-1
Contract EY-76-C-04-0789
International conference on solid state devices, Tokyo, Japan, 27 Aug 1979.

A bulk silicon technology for a high-speed static CMOS/MNOS RAM has been developed. Radiation-hardened, high voltage CMOS circuits have been fabricated for the memory array driving circuits and the enhancement-mode p-channel MNOS memory transistors have been fabricated using a native tunneling oxide with a 45 nm CVD Si sub 3 N sub 4 insulator deposited at 750 exp 0 C. Read cycle times less than 350 ns and write cycle times of 1 mu s are projected for the final 1Kx1 design. The CMOS circuits provide adequate speed for the write and read cycles and minimize the standby power dissipation. Retention times well in excess of 30 min are projected. (ERA citation 04:052119)

SLAC-PUB-2324 PC **A02**/MF **A01**
Stanford Linear Accelerator Center, CA.
Summary of IEEE Computer Standards Committee Activities.
D. B. Gustavson. May 79, 5p CONF-790549-9
Contract DE-AC03-76SF00515
Conference on computerized data - acquisition systems in particle and nuclear physics, Santa Fe, NM, USA, 14 May 1979.

The current status of standardization efforts proceedings under the IEEE Computer Standards Committee of the IEEE Computer Society is summarized as of May 1979. Names and addresses are listed as sources for further information. (ERA citation 04:052407)

SLAC-196(Rev.1) PC **A05**/MF **A01**
Stanford Linear Accelerator Center, CA.
DPAK And HPAK: a Versatile Display and Histogramming Package.
C. A. Logg, A. M. Boyarski, A. J. Cook, R. L. A. Cottrell, and S. Sund. Jul 79, 88p
Contract EY-76-C-03-0515

The features of a display and histogram package which requires a minimal number of subroutine calls in order to generate graphic output in many flavors on a variety of devices are described. Default options are preset to values that are generally most wanted, but the default values may be readily changed to the user's needs. The description falls naturally into two parts, namely, the set of routines (DPAK) for displaying data on some device, and the set of routines (HPAK) for generating histograms. HPAK provides a means of allocating memory for histograms, accumulating data into histograms, and subsequently displaying the hisotgrams via calls to the DPAK routines. Histograms and displays of either one or two independent variables can be made. (ERA citation 04:052406)

UCRL-82568(Rev.1) PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Architecture for Support of Network Operating System Services.
R. W. Watson, and J. G. Fletcher. 8 Aug 79, 34p CONF-790834-2
Contract W-7405-ENG-48
Berkeley workshop on distributed data management and computer networks, Berkeley, CA, USA, 28 Aug 1979.

It is argued that network architectures should be designed with the explicit purpose of creating a coherent network operating system (NOS). The resulting NOS must be capable of efficient implementation as the base (native) operating system on a given machine or machines, or of being layered on top of existing operating systems as a guest system. The goals and elements of a network architecture to support a NOS are outlined.

This architecture consists of a NOS model and three layers of protocol: an interprocess communication (IPC) layer, with an end--end protocol and lower sub-layer protocols as needed to support reliable uninterpreted logical-message communication; a service support layer (SSL), abstracting logical structures and needs common to most services, including naming, protection, request/reply structure, data-type translation, and session support; and a layer of standard services, (file, directory, terminal, process, clock, etc.). 6 figures. (ERA citation 04:052409)

UCRL-82924 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Optimal Reconstruction Angles.
G. O. Cook, Jr., and L. Knight. Jul 79, 23p
CONF-7906100-1
Contract W-7405-ENG-48
IEEE Computer Society conference, Newport Beach, CA, USA, 20 Jun 1979.

The question of optimal projection angles has recently become of interest in the field of reconstruction from projections. Here, studies are concentrated on the n x n pixel space, where literative algorithms such as ART and direct matrix techniques due to Katz are considered. The best angles are determined in a Gauss--Markov statistical sense as well as with respect to a function-theoretical error bound. The possibility of making photon intensity a function of angle is also examined. Finally, the best angles to use in an ART-like algorithm are studied. A certain set of unequally spaced angles was found to be preferred in several contexts. 15 figures, 6 tables. (ERA citation 04:050924)

9C. Electrical and Electronic Engineering

AD-A076 118/9 PC **A04**/MF **A01**
Yucca International Inc Scottscale Az
Software Development, Item 0005 of Microprocessor-Based Power Conditioner Controller.
Feb 79, 51p
Contract DAAK70-78-C-0117

This report describes the efforts to develop a microprocessor-based controller for the Delco 15KW power conditioner. Continuing from the hardware development, the previous task, the software necessary to perform voltage regulation of the converter section was developed. The assembled program was executed and debugged using the simulation capability provided.

AD-A076 125/4 PC **A04**/MF **A01**
David W Taylor Naval Ship Research and Development Center Bethesda Md
No-Load Testing of the Shaped Field Super-Conductive Motor.
Final rept.,
H. N. Robey , M. J. Cannell , and L. T. Dunnington. Oct 79, 55p Rept no. DTNSRDC-79/076

A laboratory-model superconductive d.c. motor, designed and constructed at the David W. Taylor Naval Ship Research and Development Center for peak power output in the 400 to 1000 hp range, has been undergoing no-load testing since January 1973. Results, reported herein, substantially validate the loss estimates (6.5 kW total power loss at 1800 rpm, 120 amp field current, open circuit) predicted in a prior analysis, and indicate that no major problems should be encountered in future planned load tests, with the possible exception of the collector electromagnetic stability, which cannot be evaluated satisfactorily at no-load conditions. Background information on machine development and discussions of the liquid metal and cryogenic helium handling procedures are also included. (Author)

EPRI-EL-1047-SR PC **A10**/MF **A01**
Electric Power Research Inst., Palo Alto, CA.
Transmission Static VAR Systems Seminar.
J. Marks, G. Addis, and I. Vancers. Apr 79, 210p
CONF-7810185-
Transmission static VAR systems seminar, Duluth, NM, USA, 24 Oct 1978.

Nine papers were presented at the meeting. A separate abstract was prepared for each paper. (ERA citation 04:054623)

EPRI-EL-1065(V.2) PC **A11**/MF **A01**
Commonwealth Associates, Inc., Jackson, MI.
Cost Components of High-Capacity Transmission Options. Volume 2. Final Report.
R. J. Broad, E. S. Doocy, F. M. Bowers, D. R. Smith, and R. K. Robottom, II. May 79, 238p

Investigation into the cost of various high-capacity transmission options is reported. The intent was to determine the in-place component costs for transmission systems to be installed in the 1985 to 1990 time frame. The rationale behind developing the costs on a component basis is to allow the reader to make design and cost component changes that fit specific conditions, thereby providing a method of estimating the cost of transmission facilities. For this study, the following common design criteria assumptions were established so that each system was evaluated on the same basis: all systems are built in the northern Midwest of the U.S.; construction techniques and labor costs are based on that area's practices and each system is designed for that environment; costs are developed for transmission systems capable of transmitting power at 2250 to 2500 MVA and 4500 to 5000 MVA for three distances: 5 urban miles, 50 suburban miles, and 200 rural miles; each system terminates at a 345 kV bus; substation costs necessary to transform the voltage to this level are included; and the design practices, including the levels of electrical effects, represent current design philosophy. The specific transmission systems considered in Volume 2 are: pipe-type cables (500 kV); SF sub 6 transmission systems (rigid and flexible); 345 kV ac superconducting systems; 500 kV dc superconducting systems; and dc transmission systems using conventional cables. The study identified those systems with relatively high economic potential. Major cost components of specific transmission systems were identified to highlight areas where further research may bring about cost reduction. (ERA citation 04:053152)

EPRI-EL-857 PC **A07**/MF **A01**
Westinghouse Electric Corp., Pittsburgh, PA.
Controlled Impedance Short Circuit Limiter. Research Report 654.
D. A. Paice, R. P. Putkovich, J. Zubek, J. Bonk, and L. Grove. Aug 78, 144p

Fault currents in power systems are increasing and are approaching the rating limits of installed equipment, particularly circuit breakers. Various approaches for limiting fault currents have been proposed, and this program was directed to investigating a specific approach: the Controlled Impedance Short Circuit Limiter (CISCL). The CISCL places in each line a series tuned inductor-capacitor circuit having virtually zero impedance during normal operation but is rapidly switched to a parallel tuned, high resistive impedance at the start of a fault, limiting the current before the first high current peak. The CICSL and several of its variations were analyzed by digital computer simulation and scaled-down model testing. Performance and economic factors were evaluated, and optimum design guidelines were established for an assumed system of rated 300 MVA at 145 kV; however, the results are applicable for a wide range of ratings. With CISCL the fault current has relatively little offset, the instantaneous peak let-thru current can be held at 2 times rated current or lower and is also resistive. The losses are typically 0.1 percent of the through-put power. Costs of components vary from $1500 to $3900 per MVA (based on 1976 costs) depending on the particular performance desired. Following the study of the technical and economic factors associated with the CISCL, a specific application was selected to serve as a basis for a prototype design. The selected application was on the Consolidated Edison Company system and involved incorporating the CISCL in a bus tie location at its Farragut substation. The prototype was designed for a rating of 345 kV and 2000 amperes and limited the peak let-thru current to 16.5 kA and the steady-state fault current to 4250 A. The estimated cost of the prototype is $5,000,000. (ERA citation 04:026269)

EPRI-EL-904(V.1) PC **A22**/MF **A01**
IIT Research Inst., Chicago, IL.
Mutual Design Considerations for Overhead AC Transmission Lines and Gas Transmission Pipelines. Volume 1. Engineering Analysis. Final Report.
J. Dabkowski, and A. Taflove. Sep 78, 502p

As a result of a program jointly funded by the Electric Power Research Institute (EPRI) and the Pipeline Research Committee (PRC) of the American Gas Association (A.G.A.), known data has been consolidated and a systematic investigation has been made into the mutual effects of ac electric power transmission lines (power lines) and natural gas transmission pipelines (pipelines) jointly sharing rights-of-way. The results presented are of use to both the electric power and natural gas transmission industries for addressing problems arising from a mutual coexistence. Program objectives were to consolidate known data concerning mutual effects arising from power lines and pipelines sharing a common right-of-way; develop a unified and systematic method for predicting electromagnetically induced voltages and currents on pipelines; and investigate mitigation techniques to minimize interference effects upon pipeline and component reliability and personnel safety. In the fulfillment of these objectives, new techniques for coupling prediction and pipeline mitigation have been developed and other available data has been collected and summarized. The overall objective of the program was to develop a reference book which concisely presented the coupling prediction and mitigation information derived in a manner useful to both power and pipeline industry users in the design, construction and operation of their respective systems. (ERA citation 04:026270)

N80-10437/5 PC **A09**/MF **A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Electrical Engineering.
Numerical Simulation of Dynamics of Brushless DC Motors for Aerospace and Other Applications. Volume 1: Model Development and Applications, Part a.
Final Report.
N. A. O. Demerdash, and T. W. Nehl. 1979, 188p
NASA-CR-160349
Contract NAS9-15091

The development, fabrication and evaluation of a prototype electromechanical actuator (EMA) is discussed. Application of the EMA as a motor for control surfaces in aerospace flight is examined. A mathematical model of the EMA is developed for design optimization. Nonlinearities which complicate the mathematical model are discussed. The dynamics of the EMA from the underlying physical principles are determined and a discussion of similating the control logic by means of equivalent boolean expressions is presented.

N80-10600/8 PC **A05**/MF **A01**
David Sarnoff Research Center, Princeton, NJ.
Analysis of S-Band Solid-State Transmitters for the Solar Power Satellite.
Final Report, 1 Nov. 1978 - 1 Jun. 1979.
E. F. Belohoubek, M. Ettenberg, H. C. Huang, M. Nowogrodzki, and F. N. Sechi. 1 Jun 79, 79p
NASA-CR-160320
Contract NAS9-15755

The possibility of replacing the Reference System antenna in which thermionic devices are used for the dc-to-microwave conversion, with solid-state elements was explored. System, device, and antenna module tradeoff investigations strongly point toward the desirability of changing the transmitter concept to a distributed array of relatively low power elements, deriving their dc power directly from the solar cell array and whose microwave power outputs are combined in space. The approach eliminates the thermal, weight, and dc-voltage distribution problems of a system in which high power tubes are simply replaced with clusters of solid state amplifiers. The proposed approach retains the important advantages of a solid state system: greatly enhanced reliability and graceful degradation of the system.

PAT-APPL-937 244 PC **A02**/MF **A01**
Department of the Army Washington DC
Phase Measurement Device.
Patent Application,
Daniel J. Ramer. Filed 28 Aug 78, 10p AD-D006 416/2

Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This document describes a device for testing phase inversion of a circuit includes a signal generator having an assymetrically shaped positive phased test signal output electrically connected through a buffer circuit to the input of the circuit under test. A differentiator circuit electrically connected to the output of the test circuits, produces in response to the test circuit output, rectangular pulses whose amplitudes are proportional to the slopes of the test waveform. The differentiated output signals are isolated into positive and negative signals by a plurality of peak detectors whose outputs are fed to a summing amplifier. The summing amplifier amplifies the difference between the positive and negative isolated peak voltages and in turn drives a polarity indicating device which was previously calibrated to indicate a positive or negative polarity as either a phase or non-phase inversion. An alternate mode of measuring pulses directly and bypassing the differentiator is also provided. (Author)

9E. Subsystems

AD-A075 640/3 Not available NTIS
Shape Technical Center the Hague (Netherlands)
Intelligible Crosstalk in Nonlinear Amplifiers: Calculation of AM-PM Transfer.
Professional paper,
G. R. Stette. 20 May 74, 8p Rept no. STC-PP-105
Availability: Pub. in IEEE Transactions on Communications, p265-269 Feb 75 (No copies furnished by DTIC).

No abstract available.

AD-A075 641/1 Not available NTIS
Shape Technical Center the Hague (Netherlands)
The Probability Density of the Output Phase of a Coherent Degenerate Parametric Amplifier in the Presence of White Gaussian Noise.
Professional paper,
T. Maseng. 29 Jun 75, 7p Rept no. STC-PP-135
Availability: Pub. in IEEE Transactions on Communications, p278-281 Feb 77 (No copies furnished by DTIC).

No abstract available.

AD-A075 692/4 PC **A03**/MF **A01**
Naval Research Lab Washington Dc
Broadband GaAs MESFET Power Amplifier Design Aspects.
Final rept.,
H. A. Willing , and W. H. Ku. 12 Oct 79, 50p Rept no. NRL-8334

This report presents design aspects of ultra-wideband GaAs MESFET power amplifiers which are directed to ECM and EW system applications. Fundamental gain-bandwidth limitations are derived for state-of-the-art GaAs MESFET power devices. Broadband designs are developed in the 2- to 18-GHz range using analytical and computer-aided optimization techniques. These designs are based upon small-and large-signal device characterization and modeling. Presented are systematic procedures required to arrive at the final designs. Modeling techniques and their utilization as a tool in achieving optimum performance are described. Included in this report is a discussion of the laboratory methods employed to perform small-and large-signal device characterization and analysis. (Author)

AD-A075 863/1 PC **A04**/MF **A01**
Wright Air Development Center Wright-Patterson AFB Oh
Evaluation of Installation of UHF Tail Cap Antenna in F-86A and E Aircraft.
Technical rept.,
William F. Sandusky , and Robert C. Lollar. Jul 52, 55p Rept no. WADC-TR-52-144

An ultra high frequency tail cap antenna which was fabricated and installed on an F-86A aircraft by North American Aviation, Inc., was flight tested on ultra high frequencies of 229.2, 316.2, and 385.6 megacycles for range, audio quality, and signal strength, both air-to-air and air-to-ground. The tests revealed that, although there are some areas of low signal strength found forward of the nose and beneath the wings of the aircraft, the antenna provides satisfactory communications, both air-to-air and air-to-ground. The radio frequency input signal strength to the antenna was greater at all times than three microvolts, which was determined by Components and Systems Lab. to be the minimum acceptable signal strength input for adequate communication reception. Maximum range of the antenna was found to be 260 statute miles while flying on an azimuth heading of 180 deg from the ground test station and transmitting at a frequency of 229.2 megacycles, and 240 statute miles while flying on an azimuth heading of 180 deg from the ground test station and transmitting at frequencies of 316.2 and 385.6 megacycles. At all other azimuth headings, the maximum usable range was found to be 210 statute miles at all three test frequencies.

AD-A075 864/9 PC **A04**/MF **A01**
Wright Air Development Center Wright-Patterson AFB Oh
Evaluation of Installation of UHF Tail Cap Antenna in F-89 Type Aircraft.
Technical rept. 28 Jan-7 Mar 52,
William F. Sandusky , and Robert C. Lollar. May 52, 51p Rept no. WADC-TR-52-104
See also Rept. no. WADC-52-70.

An ultra high frequency tail cap antenna which was fabricated and flush-mounted on the tip of the vertical stabilizer on an F-89C aircraft by Northrop Aircraft, Inc., was flight tested on various UHF frequencies for range, audio quality, and signal strength, both air-to-air and air-to-ground. The tests revealed that, although these are some areas of low signal strength found forward of the nose and beneath the wings of the aircraft, the antenna provides satisfactory communications, both air-to-air and air-to-ground. Components and Systems Laboratory has determined that three microvolts is the lowest acceptable signal strength level input for adequate reception. The radio frequency input signal strength to the antenna was greater than the three microvolts minimum at all times during the flight tests. The maximum range of this antenna was found to be 210 statute miles at 35,000 feet for signal strength readings above three microvolts and under all conditions.

AD-A075 975/3 PC **A07**/MF **A01**
Hughes Aircraft Co Fullerton Calif
Semi-Additive Processes for Fabrication of Printed Wiring Boards.
Final rept. 1 Jul 76-31 Dec 78,
Jack Quintana. Jun 79, 140p Rept no. FR 79-12-190
Contract DAAK01-76-C-1100

Printed wiring boards fabricated by semi-additive processes from four laminate types have met the requirements of MIL-P-13949, MIL-P-5110, and selected tests of MIL-P-55640. Laminate types consisted of ultra-thin copper with peelable carrier, ultra-thin copper with etchable carrier, sacrificial foil, and adhesively-coated nonclad. (Author)

AD-A076 000/9 PC **A04**/MF **A01**
Wright Air Development Center Wright-Patterson AFB Oh
Evaluation of Installation of UHF Tail Cap Antenna in F-94A Aircraft.
Technical rept. Nov 51-Feb 52,
William F. Sandusky , and Robert C. Lollar. Mar 52, 72p Rept no. WADC-TR-52-70

An Ultra High Frequency Tail Cap Antenna, which was fabricated from Lockheed Aircraft Corporation drawings, was flush mounted on the tip of the vertical stabilizer of an F-94A aircraft and was subjected to flight tests as outlined in Military Specification MIL-A-6224. The antenna was tested on various UHF frequencies for range, audio quality, and signal strength, both air-to-air and air-to-ground. The tests revealed that although some areas of low signal strength were found forward of the nose of the aircraft, the antenna provided satisfactory communications, both air-to-air and air-to-ground. Communications were audible to a maximum range of 240 miles. The radio-frequency input signal strength to the antenna was greater than the three-microvolt minimum at all elevation angles which were greater than 1.2 degrees. (Author)

AD-A076 140/3 PC **A02**/MF **A01**
Electronics Research Lab Adelaide (Australia)
An Analytic Analysis of a Kalman Filter and Smoother.
Technical rept.,
B. Billard. Jul 79, 25p Rept no. ERL-0087-TR

A Kalman filter and smoother which uses data from position measuring instrumentation to estimate changes in position, velocity, and acceleration is derived in detailed analytic form. The filtering and smoothing characteristics are shown to be completely determined by a single nondimensional parameter, which itself is a simple function of the input parameters to the filter. The concept of the bandwidth of the filter and the smoother is examined, and analytic expressions are derived for the bandwidth of the smoother, and of the filter with respect to position. The analysis highlights situations in which the smoother is clearly superior to the filter. (Author)

AD-A076 155/1 PC **A04**/MF **A01**
Army Electronics Research and Development Command Fort Belvoir Va Night Vision and Electro-Optics Labs
Overview of Pulse-Height Analysis of Image Intensifier Tubes.
Final rept. Nov 77-Sep 78,
Byong H. Ahn. Jun 79, 65p Rept no. DELNV-TR-0006

Pulse-height analysis (PHA) of image intensifier tubes (I2 tube) is described using a multiple-channel analyzer (MCA). The experimental setup, schematics of I2 tubes, statistics and mathematics for the analysis, and methods for data acquisition and reduction are included in the report. PHA complements another experimental technique which measures the noise figure (N(f)) of an I2 tube by explaining causes for good or bad performance of the tube. Technical developments of I2 tubes over the years were retraced to point out the improvements or the distinctions of a later generation I2 tube over an earlier one. Some of the tube characteristics are described in detail when they affect the N(f) or the gain noise figure. Background mathematics and statistics are illustrated, and some useful oscilloscope traces are given.

AD-A076 252/6 PC **A03**/MF **A01**
Stanford Univ Ca Computer Systems Lab
Hierarchical Design for VLSI: Problems and Advantages.
Technical note,
W. N. vanCleemput. Mar 79, 26p Rept no. TN-150
Contract N00014-75-C-0601

This paper describes the hierarchical design process for VLSI circuits and discusses the potential benefits and disadvantages. (Author)

AD-A076 298/9 PC **A06**/MF **A01**
Raytheon Co Goleta Calif Electromagnetic Systems Div
Feed Lens Portion of 3-D Dome Antenna Study.
Final technical rept. 1 Oct 77-3 Apr 79,
David T. Thomas , and S. Douglas Bixler. 10 Oct 79, 104p
Contract N00014-77-C-0760

A 3-D Dome/Rotman Lens Antenna system is described which offers the capability for greater than hemisphere scan coverage from a single feed array, greater than octave bandwidth, and multiple simultaneous beams. The history and selected results of related programs are included. Results of the analysis performed show peak phase errors of 15 degrees for scanning in the major axis planes. This error level would produce about 28 dB peak sidelobe levels for low sidelobe distributions. Complete descriptions of the analysis, computer programs and results are included. (Author)

AD-A076 317/7 MF **A01**
Syracuse Univ N Y
Nonlinear Circuit Analysis Program (NCAP) Documentation. Volume III. Programmer's Manual.
Phase rept. May 78-Jul 79,

Jon B. Valente , and Sharon Stratakos. Sep 79, 731p RADC-TR-79-245-VOL-3
Contract F30602-79-C-0011
See also Volume 1, AD-A076 384.
Availability: Microfiche copies only.

The Nonlinear Circuit Analysis Program (NCAP) is a circuit analysis code which uses the Volterra approach to solve for the transfer functions and node voltages of nonlinear circuits. To increase the transportability, the code was written in ANSI FORTRAN. The code was revised and documented in a joint effort using both in-house and contracted manpower. This documentation is a result of that effort. The documentation is made up of three volumes: the Engineering Manual, the User's Manual, and the Programmer's Manual.

AD-A076 319/3 MF **A01**
Electrospace Systems Inc Richardson Tex
Preliminary Design and Visualization Plan. 30 to 80 MHx VHF Broadband Directional Log Periodic Antenna - ESI Type 42A-1.
28 Apr 72, 100p Rept no. ER-72-10
Contract DAAB07-72-C-0137
Availability: Microfiche copies only.

The attached Preliminary Design Plan and Visualization Data is submitted for development of a 30 - 80 MHz directional log-periodic lightweight, transportable antenna for tactical field use. The Preliminary Design Plan interprets the technical parameters identified in the technical requirements. Each requirement is reduced to an item of material. Electrical characterisics of the antenna under development are described. Each electrical requirement as set forth in ECOM specification DS-EH-0050A(A) is discussed and the method of satisfying the requirement is shown. No changes or difficulties are anticipated in the electrical approach. Mechanical characteristics of the antenna array under development are described. Preliminary drawings and sketches with discussion of each component part illustrate the approach taken to satisfy the specified requirements.

ITEF-149(1977) PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Ehnergii SSSR, Moscow. Inst. Teoreticheskoi i Eksperimental'noi Fiziki.
Tracking Threshold Shaper.
A. E. Buklei. 1977, 7p
In Russian.
U.S. Sales Only.

The design of the tracking threshold shaper constructed by the "constant fraction" method is described. Changes in the circuit delay are < 0.3 ns with a PEM-signal dynamic range of 50: 1. The external cable delay makes is possible to use a shaper with different types of PEM. The operation rate of the circuit is 50 MHz. (Atomindex citation 10:452839)

PATENT-4 156 242 PC **A02**/MF **A01**
Department of the Navy Washington DC
Light-Weight Low-Cost Antenna Element.
Patent,
David Proctor. Filed 9 Jun 75, patented 22 May 79, 5p AD-D006 427/9, PAT-APPL-585 142
Supersedes PAT-APPL-585 142-75, AD-D001 240.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The antenna array is comprised of a plurality of antenna elements formed from metal-clad boards and conductive pins. Two metal-clad boards are placed together to form a sandwich, the metal-clad surfaces of the boards forming the top and bottom walls of a waveguide. Pins are placed perpendicular to the clad surfaces to form the sidewalls. The signal is introduced by a coaxial probe in the broad wall of the waveguide in a conventional manner. A row of pins defines the backwall of the waveguide. (Author)

PB80-103864 Not available NTIS
National Bureau of Standards, Washington, DC.
Some Recent Near-Field Measurements at NBS.
Final rept.,
C. F. Stubenrauch. Sep 79, 25p
Pub. in Proceedings of the Antenna Applications Symposium (1979) Held at Urbana-Champaign, IL on September 26-28, 1979, p1-25, Sep 79.

Three topics relating to recent near-field scanning work at NBS are discussed. These are: a planar scan of a large microstrip phased array, results of measurements made using cylindrical scanning, and measurements of the far sidelobe region of an antenna using a hybrid planar-cylindrical scanning system. Results of these measurements are presented and discussed.

SAND-79-0646C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Latch-Up Control in CMOS Integrated Circuits.
A. Ochoa, Jr., D. B. Estreich, and W. R. Dawes, Jr. 1979, 15p CONF-790706-1
Contract EY-76-C-04-0789
1979 IEEE Annual conference on nuclear and space radiation effects, Santa Cruz, CA, USA, 17 Jul 1979.

The potential for latch-up, a pnpn self-sustaining low impedance state, is inherent in standard bulk CMOS structures. Under normal bias, the parasitic SCR is in its blocking state, but if subjected to a high-voltage spike or if exposed to an ionizing environment, triggering may occur. Prevention of latch-up has been achieved by lifetime control methods such as gold doping or neutron irradiation and by modifying the structure with buried layers. Smaller, next-generation CMOS designs will enhance parasitic action making the problem a concern for other than military or space applications alone. Latch-up control methods presently employed are surveyed. Their adaptability to VSLI designs is analyzed. (ERA citation 04:052105)

UCRL-82121 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Efficient Numerical Procedure for Modeling Antennas over Lossy Earth.
G. J. Burke, and J. N. Brittingtham. 12 Jul 79, 8p CONF-790908-1
Contract W-7405-ENG-48
AGARD meeting, Spatind, Norway, 10 Sep 1979.

When an antenna over a ground plane is modeled by the numerical solution of an integral equation, the equation kernel involves the Sommerfeld integral formulation for the field in the presence of an interface. Direct use of this formulation is limited by excessive computation time and numerical difficulties when the antenna is close to the interface. This paper describes a procedure that is fast, without compromising accuracy, and permits modeling antennas very close to the interface. An efficient interpolation technique is used to obtain the Sommerfeld integral values from a pre-computed table. Also, the dominant singular component of the field is separated out and the integration of this component over the current is done analytically to permit evaluation for wires very close to the interface. The method is incorporated into the Numerical Electromagnetics Code (NEC). 1 figure. (ERA citation 04:052333)

9F. Telemetry

AD-A075 735/1 PC **A05**/MF **A01**
Range Commanders Council White Sands Missile Range Nm Inter-Range Instrumentation Group
Test Methods for Telemetry Systems and Subsystems. Volume I. End-to-End Test Methods for Telemetry Systems.
1979, 91p Rept no. IRIG-118-79-VOL-1
Supersedes report dated Jul 75, rept. no. IRIG-118-73-REV, AD-A016 052. See also Volume 2, AD-A075 775.

Contents: Solar Calibration; Test Methods for Transducer-Based System Calibrations; Alternate Solar Calibration Test Method; RF System Test Application Notes; Test for Receiver System Linearity.

AD-A075 736/9 PC **A06**/MF **A01**
Range Commanders Council White Sands Missile Range Nm Inter-Range Instrumentation Group
Test Methods for Telemetry Systems and Subsystems. Volume III. Test Methods for Recorder/Reproducer Systems and Magnetic Tape.
1979, 117p Rept no. IRIG-118-79-VOL-3
Supersedes report dated Jul 75, rept. no. IRIG-118-73-REV, AD-A016 052. See also Volume 4, AD-A075 789.

Contents: Head Tests; Tape Speed Tests; Speed Variation and Timing Error Tests; Direct Record Systems Tests; FM Systems Tests; Appendixes: Application Notes for Magnetic Tape Recorder/Reproducer Testing; Magnetic Tape Test Procedures.

AD-A075 775/7 PC **A09**/MF **A01**
Range Commanders Council White Sands Missile Range Nm Inter-Range Instrumentation Group
Test Methods for Telemetry Systems and Subsystems. Volume II. Test Methods for Telemetry RF Subsystems.
1979, 188p Rept no. IRIG-118-79-VOL-2
Supersedes Rept. no. IRIG-118-73-Rev, AD-A016 052. See also Volume 3, AD-A075 736.

Contents: Test Procedures for Telemetry Antenna Systems; Test Procedures for Telemetry RF Preamplifiers; Test Procedures for Telemetry Multicouplers; Test Procedures for Telemetry Receivers; Test Procedures for Diversity Combiners; and Appendixes: Intermodulation Products and Intercept Point; and Noise Figure Measurements.

AD-A075 789/8 PC **A08**/MF **A01**
Range Commanders Council White Sands Missile Range Nm Inter-Range Instrumentation Group
Test Methods for Telemetry Systems and Subsystems. Volume IV. Test Methods for Data Multiplex Equipment.
1979, 164p Rept no. IRIG-118-79-VOL-4
Supersedes rept. no. IRIG-118-73-REV dated Jul 75, AD-A016 052. See also Volume 1, AD-A075 735.

Contents: Frequency Division Multiplex (FDM) Test Procedures; Time Division Multiplex (TDM) Systems; Subcarrier Oscillators; Bit Synchronizers; The Spectrum of an NRZ-PN Sequence; Calculation of Bit Error Measurement Intervals; and Definitions and Suggested Circuits for Bit Synchronizer Testing.

PAT-APPL-6-009 003 PC **A02**/MF **A01**
Department of the Army Washington DC
Telemetric System.
Patent Application,
W. Donnally. Filed 5 Feb 79, 18p AD-D006 391/7
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The telemetric system has a conductive coil positioned adjacent to a muzzle. A burst of transducer data is electromagnetically relayed to the conductive coil from a missile after it is fired. This conductive coil has longitudinally spaced windings distributed alongside the trajectory of the missile. The effective length of the conductive coil is at least in the order of magnitude of the distance traveled by the missile while the burst of transducer data is being transmitted. Data thus received can be utilized to drive recorders or similar equipment. The missile has on its outside an associated missile coil for transmitting the burst of transducer data. The coil is driven by a modulated carrier. This modulation is provided by a delay device that is driven by a transducer. This arrangement allows transmission of data corresponding to an operating parameter of the missile after a predetermined delay.

10. ENERGY CONVERSION (NON-PROPULSIVE)

10A. Conversion Techniques

AD-A075 693/2 PC **A04**/MF **A01**
Corps of Engineers Seattle Wash Seattle District
Electrical Energy in the Pacific Northwest.
Final rept. 1975-1995,
George E. Marshall. Sep 78, 54p
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

Electrical energy supply and demand forecasts for the Pacific Northwest region vary significantly depending on the assumptions, scenarios, and the

forecasting methodology used. Unpredictable aspects of energy supply include (a) construction delays in proposed thermal power plants; (b) unexpected outages in existing thermal power plants; and (c) changing water and streamflow conditions effecting hydropower plants productivity. Forecasts of electricity demand (load forecasting) must consider hundreds of variables, most importantly population, personal income, number of households and energy prices. These factors, when applied to different forecast models, cause a variety of divergent results. In this booklet, five Pacific Northwest load forecasts are described, analyzed and compared. They are the (1) Pacific Northwest Utilities Conference Committee/west group area (PNUCC/West Group); (2) Pacific Northwest Utilities Conference Committee econometric forecast, (PNUCC/Econometric); (3) Northwest Energy Policy Project forecast, (NEPP); (4) Washington State University 'Energy projections for the Pacific Northwest', (WSU); and (5) National Resources Defense Council Forecast (NRDC). Input assumptions and forecasting methods (trend analysis, end use analysis and econometrics) used for each projection are analyzed in light of the influence they have on the resulting forecast. (Author)

AD-A075 962/1 PC **A12**/MF **A01**
Institute for Water Resources (Army) Fort Belvoir Va
National Hydroelectric Power Resources Study. Preliminary Inventory of Hydropower Resources. Volume 1. Pacific Northwest Region.
Interim rept.,
Wayne R. Sigleo , James R. Hanchey , and Darrell G. Nolton. Jul 79, 253p
Prepared in cooperation with Hydrologic Engineering Center, Davis, CA. See also Volume 2, AD-A075 963.

The Preliminary Inventory of Hydropower Resources (PIHR) a preliminary product of the National Hydropower Study (NHS), was published in six (6) volumes (regions) to facilitate reproduction and distribution. The PIHR contains general as well as site-specific information on our nation's hydroelectric power potential. It gives estimates of existing, incremental and undeveloped hydropower potential by state and region and furthermore, breaks these categories down into size ranges of small-scale (.05-15 MW) intermediate (15-25 MW) and large-scale (greater than 25MW) sites. Because the inventory is a preliminary product of the NHS, it may be superseded at some future date. Conservative assumptions have been made in the screening and analysis process to avoid eliminating any potentially feasible sites. The current summary tables provide the best estimated to date, but to some degree, may overstate the actual capacity and energy which could be developed.

AD-A075 963/9 PC **A07**/MF **A01**
Institute for Water Resources (Army) Fort Belvoir Va
National Hydroelectric Power Resources Study. Preliminary Inventory of Hydropower Resources. Volume 2. Pacific Southwest Region.
Interim rept.,
Wayne R. Sigleo , James R. Hanchey , and Darrell G. Nolton. Jul 79, 139p
Prepared in cooperation with Hydrologic Engineering Center, Davis, CA. See also Volume 3, AD-A075 964.

The Preliminary Inventory of Hydropower Resources (PIHR) a preliminary product of the National Hydropower Study (NHS), was published in six (6) volumes (regions) to facilitate reproduction and distribution. The PIHR contains general as well as site-specific information on our nation's hydroelectric power potential. It gives estimates of existing, incremental and undeveloped hydropower potential by state and region and furthermore, breaks these categories down into size ranges of small-scale (.05-15 MW) intermediate (15-25 MW) and large-scale (greater than 25MW) sites. Because the inventory is a preliminary product of the NHS, it may be suspended at some future date. Conservative assumptions have been made in the screening and analysis process to avoid eliminating any potentially feasible sites. The current summary tables provide the best estimated to date, but to some degree, may overstate the actual capacity and energy which could be developed.

AD-A075 964/7 PC **A11**/MF **A01**
Institute for Water Resources (Army) Fort Belvoir Va
National Hydroelectric Power Resources Study. Preliminary Inventory of Hydropower Resources. Volume 3. Mid-Continent Region.
Interim rept.,
Wayne R. Sigleo , James R. Hanchey , and Darrell G. Nolton. Jul 79, 241p
Prepared in cooperation with Hydrologic Engineering Center, Davis, CA. See also Volume 4, AD-A075 965.

The Preliminary INventory of Hydropower Resources (PIHR) a preliminary product of the National Hydropower Study (NHS), was published in six (6) volumes (regions) to facilitate reproduction and distribution. The PIHR contains general as well as site-specific information on our nation's hydroelectric power potential. It gives estimates of existing, incremental and undeveloped hydropower potential by state and region and furthermore, breaks these categories down into size ranges of small-scale (05-15 MW) intermediate (15-25 MW) and large-scale (greater than 25 MW) sites. Because the inventory is a preliminary product of the NHS, it may be superseded at some future date. Consevative assumptions have been made in the screening and analysis process to avoid eliminating any potentially feasible sites. The current summary tables provide the best estimated to date, but to some degree, may overstate the actual capacity and energy which could be developed.

AD-A075 965/4 PC **A10**/MF **A01**
Institute for Water Resources (Army) Fort Belvoir Va
National Hydroelectric Power Resources Study. Preliminary Inventory of Hydropower Resources. Volume 4. Lake Central Region.
Interim rept.,
Wayne R. Sigleo , James R. Hanchey , and Darrell G. Nolton. Jul 79, 217p
Prepared in cooperation with Hydrologic Engineering Center, Davis, CA. See also Volume 5, AD-A075 966.

The Preliminary Inventory of Hydropower Resources (PIHR) a preliminary product of the National Hydropower Study (NHS), was published in six (6) volumes (regions) to facilitate reproduction and distribution. The PIHR contains general as well as site-specific information on our nation's hydroelectric power potential. It gives estimates of existing, incremental and undeveloped hydropower potential by state and region and furthermore, breaks these categories down into size ranges of small-scale (.05-15 MW) intermediate (15-25 MW) and large-scale (greater than 25MW) sites. Because the inventory is a preliminary product of the NHS, it may be superseded at some future date. Conservative assumptions have been made in the screening and analysis process to avoid eliminating any potentially feasible sites. The current summary tables provide the best estimated to date, but to some degree, may overstate the actual capacity and energy which could be developed.

AD-A075 966/2 PC **A09**/MF **A01**
Institute for Water Resources (Army) Fort Belvoir Va
National Hydroelectric Power Resources Study. Preliminary Inventory of Hydropower Resources. Volume 5. Southeast Region.
Interim rept.,
Wayne R. Sigleo , James R. Hanchey , and Darrell G. Nolton. Jul 79, 197p
Prepared in cooperation with Hydrologic Engineering Center, Davis, CA. See also Volume 6, AD-A075 967.

The Preliminary Inventory of Hydropower Resources (PIHR) a preliminary product of the National Hydropower Study (NHS), was published in six (6) volumes (regions) to facilitate reproduction and distribution. The PIHR contains general as well as site-specific information on our nation's hydroelectric power potential. It gives estimates of existing, incremental and undeveloped hydropower potential by state and region and furthermore, breaks these categories down into size ranges of small-scale (.05-15 MW) intermediate (15-25 MW) and large-scale (greater than 25MW) sites. Because the inventory is a preliminary product of the NHS, it may be superseded at some future date. Conservative assumptions have been made in the screening and analysis process to avoid eliminating any potentially feasible sites. The current summary tables provide the best estimated to date, but to some degree, may overstate the actual capacity and energy which could be developed.

AD-A075 967/0 PC **A14**/MF **A01**
Institute for Water Resources (Army) Fort Belvoir Va
National Hydroelectric Power Resources Study. Preliminary Inventory of Hydropower Resources. Volume 6. Northeast Region.
Interim rept.,
Wayne R. Sigleo , James R. Hanchey , and Darrell G. Nolton. Jul 79, 316p
Prepared in cooperation with Hydrologic Engineering Center, Davis, CA. See also Volume 1, AD-A075 962.

The Preliminary Inventory of Hydropower Resources (PIHR) a preliminary product of the National Hydropower Study (NHS), was published in six volumes (regions) to facilitate reproduction and distribution. The PIHR contains general as well as site-specific information on our nation's hydroelectric power potential. It gives estimates of existing, incremental and undeveloped hydropower potential by state and region and furthermore, breaks these categories down into size ranges of small-scale (.05-15 MW) intermediate (15-25 MW) and large-scale (greater than 25 MW) sites. Because the inventory is a preliminary product of the NHS, it may be superseded at some future date. Conservative assumptions have been made in the screening and analysis process to avoid eliminating any potentially feasible sites. The current summary tables provide the best estimated to date, but to some degree, may overstate the actual capacity and energy which could be developed.

AED-Conf-78-270-003 PC **A02**/MF **A01**
One Year's Thermal Insulation Ordinance from the Point of View of a Planning Office.
K. Opladen. 1978, 4p CONF-7809122-1
In German.Building physics congress on the occasion of the ISO/glass technical fair, Duesseldorf, F.R. Germany, 28 Sep 1978.
U.S. Sales Only.

Critical comments are given on the act on Energy Saving in Buildings' and the Ordinance on Energy-Saving Thermal Insulation from the point of view of an engineering office. (ERA citation 04:053384)

ANL-CT-79-34 PC **A03**/MF **A01**
Argonne National Lab., IL.
Stability Considerations and a Double-Diffusive Convection Model for Solar Ponds.
E. I. H. Lin, W. T. Sha, and S. L. Soo. Apr 79, 42p
Contract W-31-109-ENG-38

A brief survey is made on the basic principles, current designs and economic advantages of salinity-gradient solar ponds as solar collectors and reservoirs. Solar ponds are well-suited for various AIPH (agricultural and industrial process heat) applications, and as annual storage devices for space heating and cooling. The benefit of an efficient pond is demonstrated via a preliminary economic analysis which suggests the idea of energy farming as a profitable alternative for land usage in the face of rising fuel cost. The economy and reliability of solar-pond operation depend crucially on the stability of the nonconvective gradient zone against disturbances such as generated by a severe weather condition. Attention is focused on the subject of stability, and pertinent existing results are summarized and discussed. Details of the derivation of three-dimensional stability criteria for thermohaline convection with linear gradients are presented. Ten key questions pertaining to stability are posed, whose answers must be sought through extensive analytical and numerical studies. Possible methods of approach toward enhancing solar-pond stability are also discussed. For the numerical studies of pond behavior and stability

characteristics, a double-diffusive convection model is proposed. The model can be constructed by extending the three-dimensional thermohydrodynamic computer code COMMIX-SA, following the necessary steps outlined; computational plans are described. Similarities exist between the halothermocline and the thermocline storage systems, and an extended COMMIX-SA will be a valuable tool for the investigation of both. (ERA citation 04:052965)

ANL/EES-TM-50 PC **A03**/MF **A01**
Argonne National Lab., IL.
HYCSOS: Chemical Heat Pump and Energy Conversion Systems Based on Metal Hydrides. Mid-Year Program Report.
C. A. Blomquist. Jun 79, 34p
Contract W-31-109-ENG-38

The ANL HYCSOS Metal Hydride Chemical Heat Pump Program activities are summarized. Systems engineering, conceptual HYCSOS designs, hydride heat transfer and heat exchanger studies, materials studies, and experimental studies and operations are summarized. The HYCSOS program plan is outlined. (ERA citation 04:052896)

ANL/EES-TM-55 PC **A07**/MF **A01**
Argonne National Lab., IL.
Environmental Evaluation of the PIES Trendlong Mid-Mid Scenario: Federal Region V.
Jul 79, 142p
Contract W-31-109-ENG-38

This Regional Issues Identification and Assessment (RIIA), is an evaluation of the regional environmental impacts of future energy development. The impacts described for 1985 and 1990 are based on a national energy projection (scenario) that assumes medium energy demand and fuel supply through 1990 but does not incorporate the policies of the 1978 National Energy Act (NEA). The environmental impacts discussed in this volume are for Federal Region V. There are nine companion volumes, one for each of the other federal regions in the nation. The findings of this impact evaluation of the PIES TRENDLONG MID-MID Scenario for Federal Region V (Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin) are reported. In those areas of eastern Michigan and southeastern and central Wisconsin that have not attained National Ambient Air Quality Standards (NAAQS), there will be limited opportunities for mitigation of impacts from utility coal growth through emission offsets or improved control efficiencies. In Ohio, 30% of utility coal growth could be restricted primarily because of NAAQS nonattainment. Illinois, Indiana, and Ohio may also experience problems with oil-fired utilities in nonattainment areas, but fuel purchasinhg practices could reduce the air quality impacts. Utility and industrial siting along Lake Erie may require extensive pretreatment of effluents discharged into the Lake. Allocation of water from Lake Michigan for new facilities may become an issue in Wisconsin and Illinois where large water-for-energy demands conflict with other water uses. Surface mining activities in Illinois, Indiana, and Ohio are projected to disturb approximately 200,000 acres in the period 1975 to 1990, causing temporary or permanent shifts in productivity and land use. Much of the land in the mining area is presently in forest and crops. Deaths and illnesses resulting from employment in deep mining in Region V may increase 30 to 40% over 1975 levels. (ERA citation 04:055551)

ANL/SPG-14 PC **A02**/MF **A01**
Argonne National Lab., IL.
Solar Availability for Winter Space Heating: An Analysis of the Calendar Period 1953-1975.
J. G. Asbury, C. Maslowski, and R. O. Mueller. Apr 79, 20p
Contract W-31-109-ENG-38

Solar availability for space heating has been determined from an analysis of SOLMET data tapes for eight US sites. The tapes contain hourly readings of insolation and ambient temperature for the period 1953-1975. Scatter-diagrams of insolation versus heating degree-days, compiled on a daily basis, indicate a wide variation in insolation levels, even during periods of coldest weather. For seven of the eight sites, the peak-day backup energy required by a solar space heating system exceeded 85% of the peak-day energy requirement of a conventional (nonsolar) heating system. (ERA citation 04:054286)

ANL-79-8 PC **A05**/MF **A01**
Argonne National Lab., IL.
HYCSOS: A Chemical Heat Pump and Energy Conversion System Based on Metal Hydrides. 1979 Status Report.
I. Sheft, D. M. Gruen, and G. Lamich. Apr 79, 81p
Contract W-31-109-ENG-38

The current status of the HYCSOS chemical heat pump and energy conversion system based on metal hydrides is described. Heat transfer fluid loops were insulated and modified for isothermal operation. Software development for HYCSOS manual mode operation was completed. Routines to handle data acquisition, logging, compression, correction and plotting, using a Tektronix Graphics system with flexible disk data storage, provide a rapid and versatile means of presenting HYCSOS data for analysis. Advanced concept heat exchangers to improve the heat transfer of the hydride bed with the heat transfer fluid are discussed. Preliminary tests made with a LaNi sub 5 loaded aluminum foam test unit showed that heat transfer properties are very markedly improved. Thermodynamic expressions are applied to the selection of alloys for use in HYCSOS. The substitution of aluminum for nickel in AB sub 5 type alloys is shown to reduce hysteresis and permits the use of potentially lower cost materials with added flexibility for the optimization of engineering design and performance characteristics of the hydride heat pump system. Transient thermal measurements on hydride beds of CaNi sub 5 and LaNi sub 5 show no deterioration with cycling. Relatively slow heat transfer between the hydride beds and heat transfer fluid in the coiled tube heat exchangers is indicated by temperature lag of the bed and heat transfer fluid. Improved heat transfer is anticipated with aluminum foam heat exchangers. (ERA citation 04:052895)

BNL-26390 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
MARKAL: A Multiperiod, Linear-Programming Model for Energy Systems Analysis (BNL Version).
H. Abilock, C. Bergstrom, and J. Brady. 1979, 23p CONF-791007-3
Contract EY-76-C-02-0016
Energy systems analysis international conference, Dublin, Ireland, 9 Oct 1979.

MARKAL is a demand-driven, multiperiod, LP model of energy supplies and demands. Its intended application is at the level of an entire nation. Basically, MARKAL takes exogenously supplied energy-demand figures and determines the optimal energy-supply and end-use-device network that can meet the demand. For a feasible solution, the demand must be met in each period. The exact nature of an optimal solution depends both on the criterion of optimality and the ensemble of technological and economic data supplied by a user to characterize a country's energy technologies. The MARKAL data requirements are of a technological, economic, or policy nature. Basically, for each energy carrier, a user must supply the following information for each applicable period: resource cost, period of first availability, and security weight. For each process, conversion system, and demand device, the requisite data include the following: lifetime, period of first availability, availability factors, energy conversion efficiencies, and costs for investment and fixed variable operation and maintenance. For energy carriers, minimum and maximum bounds on use are optional. So also are minimum and maximum bounds on capacity or utilization for processes, conversion systems, and demand devices. This project assesses realistically the merits of new energy technologies, characterizing their likely technological and economic characteristics. (ERA citation 04:055033)

BNL-26446 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Reference Materials System: Materials Policy Information System.
N. K. Bhagat, and K. C. Hoffman. 1979, 21p CONF-790754-1
Contract EY-76-C-02-0016
Symposium on renewable resources: a systematic approach, Saltillo, Mexico, 31 Jul 1979.

The social and economic development of a nation is dependent on a reliable supply of materials and energy and on the efficient utilization of these resources. Decision making in industry and the formulation of government policies require a comprehensive information base encompassing the technical, economic, and environmental factors involved in the flow of materials through production processes and the overall economy. The Reference Materials System (RMS) is a network description of the flow of materials from resource extraction through refinement, production, and transportation processes to the utilization, maintenance, and recycling operations. The system has been employed for the assessment of material production technologies and for the evaluation of substitution possibilities. The RMS provides a framework for integrating engineering and economic information into a comprehensive systems framework. The network flow diagram is quantified in terms of the mass flow of all renewable and nonrenewable materials on an annual basis through each step of the system. A variety of data elements including capital and labor requirements may be organized in this framework to provide a Materials Policy Data Base. This process description of the materials system may also be coupled with economic policy models of the input–output or econometric variety to ensure proper analysis of the role of materials in the overall economy. (ERA citation 04:051766)

BNL-26452 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Integrated Methodology for Assessing Energy-Economy Interactions.
J. Lukachinski, P. J. Groncki, R. G. Tessmer, Jr., R. J. Goettle, IV, and E. A. Hudson. 1979, 17p CONF-791007-2
Contract EY-76-C-04-0789
Energy systems analysis international conference, Dublin, Ireland, 9 Oct 1979.

Brookhaven National Lab. (BNL) has collaborated in development of an integrated technological and econometric representation of the nation's energy and economic systems. Among the applications of this integrated methodology are the assessment of energy-economy interactions, benefit/cost analyses of alternative energy policies, and multi-objective supply and demand studies relating to energy R and D and technology change. The integrated analytical system is comprised of three component models. The economic growth model included in this framework is the Dale W. Jorgenson Associates (DJA) Long-term Interindustry Transactions Model (LITM). The LITM model provides a flexible, interindustry representation of sectoral production and final demand, and captures the combined influences of productivity, investment, and labor supply on the long-term expansion of US productive capacity. The second component of this model system is a detailed technological model of energy supply, conversion, and end-use demand. The Time-stepped Energy System Optimization Model (TESOM) developed by BNL represents the full feasible range of energy resource and technology substitutions for the US energy system. The final component of this model framework is the input-output model developed jointly by BNL and the Univ. of Illinois. This detailed input-output model of the structure of the US economy maps the outputs of the conventional energy-supply and -conversion sectors into non-substitutable energy-service demands for each interindustry sector and final demand. The BNL/DJA combined model system provides a comprehensive long-run representation of US energy consumption and energy-economy interactions. (ERA citation 04:053261)

BNL-26472 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Applications of Energy Systems Analysis to Policy and Technology Studies.
M. Beller. Jul 79, 16p CONF-791007-1
Contract EY-76-C-02-0016
Energy systems analysis international conference, Dublin, Ireland, 9 Oct 1979.

The use of a Reference Energy System, a network representation of all of the technical activities required to supply various forms of energy to end-

use activities, is described. Technologies are defined for all operations involving specific fuels including their extraction, refinement, conversion, transport, distribution, and utilization. Each of these activities is represented by a link in the network for which efficiency, environmental impact, and cost coefficients may be specified. The network is quantified for a given year with the level of energy demands and the energy flows through the supply activities that are required to serve those demands. RES are used in an assessment to evaluate new technologies by the techniques of perturbation analysis, and the Brookhaven Energy System Optimization Model includes the same input parameters that are used in the RES. The construction of RES is given. How to use RES for technology and policy assessment is discussed, followed by some example cases. The use of BESOM applied to multi-objective analysis is noted. RES is being used as a starting point for the development of an Energy Emergency Management Informaion System. (ERA citation 04:051767)

BNL-26482 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Energy Optimization of Industrial Energy Use.
D. A. Pilati, and F. T. Sparrow. 1979, 7p CONF-791009-3
Contract EY-76-C-02-0016
International conference on energy use management, Los Angeles, CA, USA, 22 Oct 1979.

The Brookhaven National Laboratory Industry Model Program (IMP) has undertaken development of a set of industry-specific process-optimization models. These models are to be used for energy-use projections, energy-policy analyses, and process-technology assessments. Applications of the models currently under development show that (1) system-wide energy impacts may be very different from engineering estimates, (2) selected conservation strategies may have the perverse effect of increasing energy use, and (3) a proper combination of energy taxes and investment tax credits is more socially desirable than either policy alone. (ERA citation 04:051871)

BNL-50922 PC **A03**/MF **A01**
Brookhaven National Lab., Upton, NY.
Solar and Geothermal Energy Utilization N SF-2: A Sensitivity Analysis.
H. Davitian, R. LaSala, and W. Marcuse. 5 Apr 77, 33p
Contract EY-76-C-02-0016

A sensitivity analysis was conducted of the utilization levels for Solar, Geothermal, and Advanced Energy Systems (ASGA) technologies during the 1985-2000 time period. In particular, the sensitivity of the utilization levels was tested with respet to both analytical techniques and to specific parameter assumptions. The sensitivity to analytical techniques was examined insofar as certain criteria were examined to elucidate their importance in determining the level of use of the ASGA technologies. The criteria incorporated consideration of such factors as total cost of the energy system, environmental impacts, and resource use patterns. The parameter assumptions studied included costs of ASGA costs of ASGA technologies, costs of non-renewable resources, and limitations on the use of technologies and resources. (ERA citation 04:054282)

BNL-50939 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Normal Incident Solar Radiation Measurements at Upton, New York.
J. G. Cottingham. 24 Oct 78, 15p
Contract EY-76-C-02-0016

Normal incident solar energy measurements made at Upton, L.I., New York are reported and analyzed relative to the total energy received on a horizontal surface. A new method for computing normal incident solar radiation is developed and used to study long term variations in this energy source at Upton and to estimate average values for other east coast locations. (ERA citation 04:054287)

BNL-50969 PC **A07**/MF **A01**
Brookhaven National Lab., Upton, NY. National Center for Analysis of Energy Systems.
Annual Highlights of the National Center for Analysis of Energy Systems.
K. C. Hoffman. Dec 78, 133p
Contract EY-76-C-02-0016

The National Center for Analysis of Energy Systems at Brookhaven has been in operation since January 1976. This annual highlights report outlines the scope of activities of the Center involving the integrated analyses of technological, economic, environmental, and social aspects of energy at the regional, national, and international levels. The objectives of the Center and major accomplishments of 1978 are described along with a list of active projects and publications. The energy data bases and analytical models used in the cousre of policy analyses are also described. The major ongoing activities of the Center include: analysis of energy-economic relationships; regional energy and environmental policy; comparative health effects of alternative energy systems; technology assessment and energy R and D priorities; development of energy-economic-environmental models and data bases; R and D strategies for the International Energy Agency; and energy technologies for developing countries. The multidisciplinary approach used in the Center and the close interaction with other analytical groups in universities and industry provide a unique perspective on the energy situation. This perspective is given emphasis in the 1978 highlights report. (ERA citation 04:055034)

CONF-7610164-1 PC **A02**/MF **A01**
Cooperation Mediterraneenne pour l'Energie Solaire, Marseille (France).
Inside-Mirrored Rotational Funnel as a Concentrating Solar Collector.
H. Kleinwaechter. 1976, 16p CONF-7609207-1
Symposium on the applications of solar energy, Teheran, Iran, Oct 1976, Portions of document are illegible.
U.S. Sales Only.

The development, the prototypes and the first results with this type of collector are discribed. It consist of a inside mirrored funnel which concentrates as a function of its special geometry the solar rays on an area with a homogeneous or other desired distribution. The collector is designed to produce steam of over 500 exp 0 Kelvin and 15 bar of pressure, to drive pumps, electric power stations, water-desalination plants and absorption chillers. The reflector, its construction, the solar tracking system and the absorbent surface with its optimization and selectivity are described. (ERA citation 04:049768)

CONF-7709114- PC **A11**/MF **A01**
Energy Research and Development Administration, Oak Ridge, TN. Oak Ridge Operations Office.
3RD ERDA Energy Management Symposium.
1977, 228p
ERDA energy management symposium, Knoxville, TN, USA, 19 Sep 1977.

A separate abstract was prepared for each of eleven collected papers that were presented at the symposium. No proceedings were published. (ERA citation 04:051793)

CONF-7804121-(Absts.) PC **A03**/MF **A01**
El Paso, City of, TX.
International Solar Energy Conference and Fair.
1978, 29p
International solar energy conference and fair, El Paso, TX, USA, 13 Apr 1978.

This conference program contains general information, program schedule, floor plan of the meeting area, and synopses of selected presentations which are title listed. (ERA citation 04:052737)

CONF-7805129- PC **A08**/MF **A01**
Purdue Univ., Lafayette, IN. Agricultural Experiment Station.
Solar Grain Drying Conference Proceedings.
J. G. Hartsock. 1978, 153p
Contract EX-76-A-29-1032
Solar grain drying conference, West Lafayette, IN, USA, 2 May 1978.

Sixteen papers are included on solar grain drying. Separate abstracts were prepared for each paper. (ERA citation 04:054451)

CONF-7809138- PC **A11**/MF **A01**
Illinois Univ. at Chicago Circle. Energy Resources Center.
Electric Utilities in Illinois.
1978, 247p
Contract EW-78-C-02-5105
Annual Illinois energy conference on electric utilities, Chicago, IL, USA, 27 Sep 1978.

Although the conference dealt specifically with concerns of the electric utilities in Illinois, the issues were dealt with in the national context as well. A separate abstract was prepared for each of the 5 sections of this proceeding. A total of 25 papers were presented. Section titles are: Forecasting, Planning and Siting, Reliability, Rates and Financing, and Future Developments. (ERA citation 04:051815)

CONF-790446-5 PC **A02**/MF **A01**
Argonne National Lab., IL.
HYCSOS Chemical Heat Pump and Energy Conversion System Based on Metal Hydrides.
I. Sheft, D. M. Gruen, and G. J. Lamich. 1979, 8p
Contract W-31-109-ENG-38
Annual heat pump technology conference, Stillwater, OK, USA, 9 Apr 1979.

The Argonne HYCSOS system is a two hydride concept, operating as a chemical heat pump for storage and recovery of thermal energy for heating, cooling and energy conversion. Hydrogen gas is transferred from one hydride bed by solar thermal energy input at a characteristic temperature to a second bed where hydrogen is absorbed and thermal energy is released at another temperature appropriate for the mode of operation in use. The basic HYCSOS concept uses thermal energy from a low grade source such as a solar collector to decompose a hydride, e.g., CaNi sub 5 , and the released hydrogen is absorbed at a lower, intermediate, temperature and stored as a second hydride, e.g., LaNi sub 5 H sub 6 . The heat pump mode is the low temperature dissociation of the LaNi sub 5 H sub 6 and the absorption of the hydrogen at the intermediate temperature. The intermediate temperature is available for space heating, using solar energy during periods of insolation and using low temperature ambient heat via heat pump action during other times. Operated in a reverse mode, the system can be used for refrigeration, eliminating the mechanical compression required in the operation of a conventional air conditioner. With three hydride heat exchangers containing the same hydride cycling between a high temperature and a lower one, a continuous supply of high pressure hydrogen can be generated to do useful work in an expansion engine-dynamo unit supplying electricity, the hydrogen being absorbed after expansion on the alloy at a lower temperature. The current status of the HYCSOS system is discussed. (ERA citation 04:052898)

CONF-7906112-1 PC **A02**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
Energy Use Quantification in the Canning of Clingstone Peaches.
P. A. Carroad, R. P. Singh, M. S. Chhinnan, N. L. Jacob, and W. W. Rose. 1979, 13p
Contract EY-76-C-07-1570
IFT meeting, St Louis, MO, USA, 10 Jun 1979.

Thermal and electrical energy usages in a California Clingstone peach cannery were monitored to establish energy consumption levels and to identify energy intensive unit operations. Representative processing lines were instrumented with orifice plates for steam flow measurements and with electric watt transducers for electrical power monitoring to yield actual consumption values. Steam use in the lye peelers and retorts accounted for 98% of all energy consumed, indicating that further examination of these operations for modification or equipment redesign should be a first priority for energy conservation. Pumping of liquids and dry conveying of fruit and waste material accounted for 61% of all electrical energy use. Electrical energy use amounted to only 2% of the total energy used, however, on an equivalent fossil fuel use basis. (ERA citation 04:051869)

CONF-790672-2 PC **A02**/MF **A01**
Argonne National Lab., IL.
Software Strategies for Integrated Community Energy Systems.
V. A. Rabl, J. M. Calm, and J. J. Roberts. 1979, 6p

Contract W-31-109-ENG-38
International symposium on modeling, planning, and decision in energy systems, Montreux, Switzerland, 19 Jun 1979.

Community systems offer energy-conserving alternative methods of meeting the energy service needs of residential, commercial, and other facilities while conserving energy and scarce fuels. This paper discusses the Integrated Community Energy Systems (ICES) approach, explores the need for computerized methods for ICES, and presents a simulation and optimization software series developed or under development for planning and design of such systems. The software addresses the analysis of community loads and energy requirements as well as the supply and distribution subsystems. Since ICES may provide several different energy services simultaneously, the overall energy conservation and economic potentials of the system are critically dependent on the match between the community demand and the supply system performance characteristics. The software has, therefore, been designed not only to simulate the system performance, but also to select optimal equipment capacities and system operation so as to minimize, at the user's choice, either the energy consumption or system costs. The ICES applications place a number of additional requirements on the software, including flexibility, modularity, ease of use, efficiency, and portability. (ERA citation 04:053291)

CONF-790672-4 PC **A02**/MF **A01**
Argonne National Lab., IL.
Implications of Seasonal Peak Demand Forecasts for Electric Heating Desirability.
D. J. Santini. 1979, 8p
Contract W-31-109-ENG-38
International symposium on modeling, planning, and decision in energy systems, Montreux, Switzerland, 19 Jun 1979.

The peak demands for heating and cooling as a function of building type and climate are estimated. Electric utilities' peak summer and winter electrical demands arising from use of typical electric appliances (air conditioners, resistance heating, and heat pumps) are estimated for present and predicted saturations of these appliances in many major US metropolitan areas. Most US electric utilities presently have excess capacity during winter months and are improving their load factor as sales of electric heating appliances significantly exceed historical levels. It is shown that this opportunity for load factor improvement will be transitory in many cases. Metropolitan areas fall into three categories: those (1) in which excess winter capacity is likely to be available regardless of electric heating saturation; (2) with current excess winter capacity that will become winter peaking with present heat appliance installation rates; and (3) presently winter peaking. The conclusion of the research is that, in case (3) US rates of heating appliance installation are slightly excessive. In case (2) the rates are now desirable, but if continued would be excessive by the turn of the century. For case (1) it is desirable to continue the rates indefinitely. (ERA citation 04:053385)

CONF-790739-2 PC **A02**/MF **A01**
Department of Energy, Laramie, WY. Laramie Energy Technology Center.
Case Study of an Application of Computer Mapping in Oil-Shale Resource Mapping.
F. G. F. Davis, Jr., and J. W. Smith. 1979, 20p
Harvard computer graphics week '79, Cambridge, MA, USA, 15 Jul 1979.

The Laramie Energy Technology Center, U.S. Department of Energy, is responsible for evaluating the resources of potential oil and the deposit characteristics of oil shales of the Green River Formation in Colorado, Utah, and Wyoming. While the total oil shale resource represents perhaps 2 trillion barrels of oil, only parts of this total are suitable for any particular development process. To evaluate the resource according to deposit characteristics, a computer system for making resource calculations and geological maps has been established. The system generates resource tables where the calculations have been performed over user-defined geological intervals. The system also has the capability of making area calculations and generating resource maps of geological quality. The graphics package that generates the maps uses corehole assay data and digitized map data. The generated maps may include the following features: selected drainages, towns, political boundaries, township and section surveys, and corehole locations. The maps are then generated according to user-defined scales. (ERA citation 04:049499)

CONS-0014-T1 PC **A11**/MF **A01**
California Energy Commission, Sacramento. Conservation Div.
Grant Request: To Implement Energy Conservation Measures as Part of the State Original and Supplemental Energy Conservation Plans.
16 Jan 78, 234p
Contract EW-78-G-49-0014
Portions of document are illegible.

The program measures described in this document comprise a grant request to DOE under the Energy Policy and Conservation Act of 1975 and the Energy Conservation and Production Act of 1976. The amount requested, $5,555,000, will allow the extension, acceleration, and implementation of energy conservation activities already in progress in California. Accomplishments to date have included the adoption of residential standards, and the implementation of an energy survey program for public buildings. Efficiency standards have been established for refrigerators and room and central air conditioners, appliances which utilize a significant amount of residential energy. Before the end of 1977, efficiency standards will be established for clothes dryers, washers, and water heaters. Program elements are: technical/financial assistance; public awareness; standards setting; solar element; research/analysis/evaluation; and coordination and management. (ERA citation 04:050170)

COO-2577-18 PC **A02**/MF **A01**
Colorado State Univ., Fort Collins.
Comparative Performance of Two Types of Evacuated Tube Solar Collectors in a Residential Heating and Cooling System. The Progress Report.
T. M. Conway, W. S. Duff, G. O. G. Lof, and R. G. Pratt. 1979, 5p CONF-790541-52
Contract EY-76-S-02-2577
International Solar Energy Society meeting, Atlanta, GA, USA, 28 May 1979.

Two types of evacuated tube solar collectors have been operated in space heating, cooling and domestic hot water heating systems in Colorado State University Solar House I. An experimental collector from Corning Glass Works supplied heat to the system from January 1977 through February 1978, and an experimental collector from Philips Research Laboratory, Aachen, which is currently in use, has been operating since August 1978. A flat absorber plate inside a single-walled glass tube is used in the Corning design, whereas heat is conducted through a single glass wall to an external heat exchanger plate in the Philips collector. In comparison with conventional flat-plate collectors, both types show reduced heat losses and improved efficiency. For space heating and hot water supply in winter, the solar delivery efficiency of the Corning collector ranged from 49% to 60% of the incident solar energy. The portion of the space heating and domestic hot water load carried by solar energy through fall and winter ranged from 50% to 74%, with a four-month contribution of 61% of the total requirements. Data on the Philips collector are currently being analyzed. (ERA citation 04:052967)

COO-4465-2 PC **A11**/MF **A01**
Pennsylvania Univ., Philadelphia.
Status of Energy Management Academic Programs in US Institutions of Higher Education. Final Report, Part I.
L. Eisenberg, C. Daspit, and G. Shimamoto. Sep 78, 235p
Contract EE-77-S-02-4465

Energy Management is described as an interdisciplinary, problem-solving activity concerned with assessment and control of the economic, environmental, and societal effects of energy resource distribution, production, conversion, or end use. Its objective is the optimum use of energy in a socially acceptable environment. An energy-management program is considered to be a formal course of study, leading to the bachelor's or higher degree, which addresses the range of energy-management issues. To identify energy-managment programs and related courses, 2602 US institutions of higher education were surveyed. More detailed information was sought from respondents who indicated that they had, or planned to offer, such a program. Ultimately ten existing, and seven planned, programs were identified. In addition, 303 institutions were found to offer one or more couses on some aspect of energy management. The ten existing programs were classified as undergraduate, engineering-focused, or general/diversified. They were analyzed in terms of their administrative organization, enrollment and number of degrees awarded to date, availability of financial support for graduate students, program goals and curriculum design, background of pesent students, employment of graduates, and the types of problems and needs cited by program heads. Information on the planned programs, when available, was also included in this analysis. (ERA citation 04:053292)

COO-4577-8 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Evaluation of Combined Photovoltaic/Thermal Collectors.
S. D. Hendrie. 1979, 5p CONF-790541-54
Contract EG-77-S-02-4577
International Solar Energy Society meeting, Atlanta, GA, USA, 28 May 1979.

The thermal and electric performance of an air and a liquid type combined photovoltaic/thermal solar collector has been evaluated, yielding close correlation with theoretical results. Maximum thermal efficiencies of 42.5% and 40% for the liquid and air collectors without electric power production decreased to 40.4% and 32.9% when electrical power was produced. Maximum electrical efficiencies of 6.8% were measured. (ERA citation 04:051318)

COO-4750-1 PC **A11**/MF **A01**
Dalton-Dalton-Little-Newport, Inc., Cleveland, OH.
Development of a Management System for Implementing the NEPA Process in the Department of Energy. Technical Progress Report, March 1, 1978--February 28, 1979.
R. G. Rolan. Apr 79, 227p
Contract EP-78-C-02-4750

DOE'S numerous difficulties in responding to the National Environmental Policy Act have sometimes resulted in costly program delays. The Assistant Secretary for Environment commissioned this three-year project to develop a comprehensive approach to managing NEPA compliance agencywide. The first year's effort resulted in the conceptual design described in this report. The approach used in the NEPA Management System (NMS) project included: analysis of DOE's basic functions to achieve its mission and their associated environmental requirements; analysis of existing DOE mechanisms for meeting these environmental requirements; development of potential approaches for improving the Department's response to NEPA. The issues and potential solutions presented are based on review and analysis of scores of DOE management guidance documents and interviews with hundreds of DOE personnel, both at headquarters and in the field. A six-part Conceptual Framework of the NMS was developed to organize the analysis and present its conclusions. Potentially responsive approaches to improve DOE's NEPA response include: early consideration of the environment in departmental policy making and regulations development; early, detailed planning for NEPA document preparation and review; integration of NEPA compliance activities with DOE procurement processes; institution of post-EIS mitigation and monitoring procedures; development of comprehensive guidance for all aspects of NEPA compliance. Conceptual approaches to solving each of these problems are presented as a basis for more detailed work in the second year. (ERA citation 04:051801)

COO-4878-5 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Ceramic Solar Receivers.
P. O. Jarvinen. 1979, 6p CONF-790803-39

Contract ET-78-S-02-4878
14. intersociety energy conversion conference, Boston, MA, USA, 5 Aug 1979.

The application of ceramic materials to high temperature solar receivers for advanced Brayton and advanced Stirling thermal electric systems is discussed. Conceptual designs for ceramic cavity receivers employing impingement jet-cooled, dome-shaped silicon carbide heat exchanger modules are offered. Optical, mechanical, heat transfer and structural analyses of this novel receiver approach are presented. (ERA citation 04:052968)

DOE/CS-0094 PC **A07**/MF **A01**
Department of Energy, Washington, DC. Office of Conservation and Solar Applications.
Report to the Congress on the Coordination of Federal Energy-Conservation Programs Involving State and Local Governments.
Jul 79, 132p

During the past four years, the Congress has enacted four major laws authorizing the Federal government to develop and implement specific energy-conservation programs. These include the Energy Policy and Conservation Act of 1975 (state energy conservation program); Energy Conservation and Production Act of 1976 (weatherization assistance program); Energy Research and Development Administration Authorization Act of 1977 (EES); National Energy Conservation Policy Act of 1978 (schools, hospitals, public-care institution programs, and residential conservation services). In addition, there are three other programs: urban waste program, community systems program, and appropriate technology program. Based on a survey of DOE and other Federal agencies, fifty additional programs which have as a primary goal the provision of a service related to reducing energy demand have been identified throughout the Federal government and are included in this report. The main body of the report describes in detail coordination efforts related to all major Conservation and Solar Applications Office energy-conservation programs involving state and local governments. Following one-page summaries of Federal activities contained in Appendix A, Appendix B provides a matrix of the services provided. (ERA citation 04:050171)

DOE/CS/20258-1 PC **A02**/MF **A01**
Illinois Univ., Urbana.
Labor and Energy Impacts of Energy Conservation Measures. First Quarterly Progress Report.
R. A. Herendeen. 12 Apr 79, 2p
Contract AC02-79CS20258

Work has progressed along two lines: obtaining of detailed occupation, industry, wage, and skill information; and obtaining of detailed materials and labor requirements (so-called direct requirements) for conservation and solar options. The latter is currently focused upon thermally tight single-family residences (vs. as-built). Both of these inputs will be used in conjunction with our input-output employment-energy model. (ERA citation 04:055045)

DOE/EIA-0036/2App. PC **A99**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Annual Report to Congress. Volume II, Appendix. Summary Data Inputs and Forecasts for 1985 and 1990.
Sep 78, 734p

A summary of the key parameters, assumptions, and data inputs that were used to generate the 1985 and 1990 forecasts in Volume II of the EIA Annual Report to Congress, 1977, is presented. Section 2 provides a brief overview of the series projection approach utilized for the AAR. The combinations of macroeconomic, energy reserves, and world crude oil price assumptions used in the projections are also summarized in Section 2. Section 3 illustrates the linkages of the various models used to operate the forecasts. A list of the key values and assumptions used as inputs to the PIES is presented in Section 4. A summary table of the six forecast estimates generated by PIES appears in Section 5. The complete computer output of PIES for each of the projection series is contained in Appendix A. All of the data inputs for each series are included in Appendix B. Four regional maps illustrating the oil and gas supply, refinery, DOE, and coal supply regions are in Appendix C. Appendix D contains a list of the units of measure and conversion factors included in the report. (ERA citation 04:055046)

DOE/EIA-0076 PC **A03**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Motor Gasoline Supply and Demand 1967 to 1978.
K. E. Seiferiein. Aug 78, 41p

Data on motor gasoline supply and demand are presented in tables and graphs. Consumption patterns are considered. (ERA citation 04:053298)

DOE/EIA-0102/1 PC **A02**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Fact Sheet: Forecasted Automobile Gasoline Consumption. Analysis Memorandum, AM/EU-7801.
May 78, 13p

The system used for projecting automotive gasoline consumption and efficiency which was used for the EIA Annual Report to Congress made use of historical data on fuel efficiency, together with specific projections of gasoline prices and major macroeconomic variables. Projected new-car efficiency was based upon the assumption that manufacturers would attempt to minimize the sum of the manufacturing costs arising from improved efficiency and civil penalties associated with not meeting EPCA efficiency standards. In Volume II of this report, estimated on-road efficiencies were calculated by applying a constant degradation factor to efficiencies as measured on the basis of EPA tests. This yields an on-road efficiency of about 21 mpg in 1985. In an analysis which has been done since release of the report, a new set of empirically estimated degradation factors was used to estimate the on-road new car efficiencies and gasoline consumption which would be consistent with meeting EPCA standards. This resulted in estimates of future on-road efficiencies during the mid-1980's which are generally somewhat higher than those used in the report's analysis. Automobile gasoline consumption was estimated by using the new set of degradation factors to project the range of consumption levels which may be achieved by meeting EPCA standards through 1985. It was found that the automotive gasoline consumption for the 1978 to 1985 period which was projected in the report was within the range of estimates resulting from the application of the new degradation factors. (ERA citation 04:054144)

DOE/EIA-0102/11 PC **A03**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Motor Gasoline Supply and Demand Through 1980. Analysis Memorandum AM/ES/78-19.
Aug 78, 38p

Estimates of motor gasoline supply and demand provided to the Economic Regulatory Administration are presented and the methodology used to derive those estimates is described. In this analysis a regional econometric model is used to estimate future motor gasoline demand based on alternate assumptions about economic growth. Next, a refinery model is used to estimate the refining capacity required to meet the projected demand levels. Projected refining capacity requirements are compared with projected available refinery capacity to determine whether motor gasoline supply will be adequate to satisfy the projected demand. (ERA citation 04:055078)

DOE/EIA-0102/12 PC **A02**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Forecasts of Principal Petroleum Product Demands 1979, 1985, 1990 by DOE Region and Four Macroeconomic/Geologic Scenarios.
C. Allen, W. Gaynor, and H. Walton. Aug 78, 14p

The Energy Information Administration (EIA) was requested by the Economic Regulatory Administration to provide estimates of the domestic demand for the principal refined petroleum products in 1980, 1985, and 1990 in each region of the country. This information was to be used in DOE testimony before the US Senate Subcommittee on Energy Conservation and Regulation on July 10, 1978. Tables 1 to 4 of this Analysis Memorandum present the range of domestic demand estimates for 1979, 1985, and 1990 for gasoline, distillate fuel oil, residual fuel oil, and jet fuel oil. The range was obtained by considering four macro-economic/geologic scenarios originally developed for the EIA Annual Report to Congress, Volume II, (AAR) published in April 1978. Descriptions of the pecise assumptions underlying these scenarios can be found in the AAR. Demands for 1979 were developed using the Short-Term Petroleum Product Demand (STPPDM) Model, while forecasts for 1985 and 1990 were developed by the EIA mid-range energy modeling system. All forecasts are consistent with those published in the AAR. Forecasts for 1980 are not presented because the short-term model has not been validated for that year using the scenario definitions contained in the AAR. (ERA citation 04:053299)

DOE/EIA-0102/13 PC **A03**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Assessment of Potential US Petroleum Supply Shortfalls, 1978 to 1990. Analysis Memorandum AM/IA/78-25.
D. Butler. 15 Sep 78, 38p

An assessment of potential US petroleum supply shortfalls for the period 1978 to 1990 is based upon scenarios defined by the Department of Energy, International Affairs, in a June 19, 1978 memorandum entitled Supply Disruption Scenarios. The Energy Information Administration's (EIA) Oil Market Simulation model was used to quantify the oil price increases that would be necessary to constrain world demand for OPEquantity the oil oil to not exceed EIA's most optimistic estimates of OPEC production capacity. The EIA projection series have been modified to reflect the likelihood of constrained world oil supplies in the 1980s and associated increases in oil prices required to balance world supply and demand. The resulting modified versions of Projection Series C and D are referred to as Projection Series G and H, respectively. The new supply and demand projections were then used as the basis for calculating supply shortfalls using the Petroleum Allocation (PAL) model. A total of five disruption scenarios were simulated for the years 1978, 1980, 1985, and 1990 using the PAL model. The expected supply shortfalls to the United States resulting from each of these cases are summarized. The potential shortfalls vary significantly over the five disruption scenarios, ranging between 1.7 and 6.0 million barrels per day for the year 1978. However, the potential shortfalls are not expected to increase significantly during the 1980's. The estimates for 1990 increase to be between 2.0 and 6.8 million barrels per day. The principal reason for this relative stability of the projections over time is the assumed constraint on the future availability of OPEC oil even before any supply disruption occurs. This limited OPEC supply results in increasing prices of world oil, reduced demand growth, and only slight increases in the exposure of the industriaized countries to disruptions in the supply of Arab oil. (ERA citation 04:054146)

DOE/EIA-0102/14 PC **A08**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
International Energy Supply and Demand, Support Documentation for the Administrator's Annual Report, 1977. Analysis Memorandum No. AM/IA/78-23.
W. C. Kilgore, M. E. Rodekohr, G. D. Butler, D. B. Cato, and E. S. Paul. 21 Aug 78, 164p

An analysis associated with Chapter 4 (International Energy Supply and Demand) of the EIA Annual Report, Volume II, 1977, is presented. The major areas of analysis include: energy supply, demand, electricity generation, economic growth, and balance of payments, dealing only with international aspects. Specifically, data on coal, natural gas, and petroleum are presented. (ERA citation 04:055107)

DOE/EIA-0102/17 PC **A04**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.

Sector Employment Implications of Alternative Energy Scenarios.
R. F. Earley, and M. M. Mohtadi. 21 Aug 78, 55p

Five energy scenarios selected for use in the Administrator's Annual Report, reflecting assumptions about economic growth and energy supply, give rise to alternative states of the aggregate economy. Shifts in the level and composition of final demand for the economy imply different structures of industrial output with concomitant effects on the level and composition of employment. The implications which the five energy scenarios have for the structure of employment in the US economy for 1985 are examined. The first section discusses the model and simulation procedures used to derive sector employment levels and discusses the limitations of the approach. The second section presents a discussion of the generic relationship between changes in the level and composition of final demand and the effects of such changes on employment. The third section addresses the employment implications of five energy scenarios reported in the Administrator's Annual Report. (ERA citation 04:055079)

DOE/EIA-0102/3 PC **A03**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Projected 1985 Automobile Gasoline Savings from the House-Passed Gas Guzzler Tax and Conference Minimum Mileage Standards. Analysis Memorandum AM/EU-7802.
F. Emerson, and H. Walton. Jun 78, 42p

An analysis is presented of the potential 1985 impacts from the House-passed gas guzzler tax and the Conference minimum mileage standards. Two alternative methodologies were employed for the purpose of this analysis. One approach used the DOE Faucett model. The other used DOT projections of the automobile manufacturers' capabilities to meet EPCA new car economy standards based on data obtained from the manufacturers. (ERA citation 04:054141)

DOE/EIA-0102/6 PC **A03**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Relationship Between Crude Oil Price Controls and Refined Product Prices.
R. M. Isaac. Jul 78, 33p

This Analysis Memorandum is a response to a request from the Office of Policy and Evaluation for an independent evaluation of recent work done by Charles Phelps and Rodney Smith of the Rand Corporation. The Phelps and Smith proposition is that, because the effects of crude oil price controls are not fully reflected in refined product prices, the proposed crude oil equalization tax would have little or no effect on refined product prices, consumption, or total petroleum imports. This paper focuses on the arguments, assumptions, and implications of the ongoing discussion of the Phelps-Smith arguments. (ERA citation 04:052549)

DOE/EIA-0102/8 PC **A07**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Evaluation of Energy Related Tax and Tax Credit Programs. Analysis Memorandum AM/IA/78-12.
K. L. Kincel, F. H. Murphy, and H. Walton. 17 Jul 78, 128p

This report presents the results of an EIA analysis of several energy tax and conservation measures associated with the National Energy Act and currently under consideration by the Congress. The measures addressed include: the proposed tax credits for energy conservation and solar investments (H.R. 5263, Parts I and III); petroleum and natural gas user taxes and industrial investment tax credits both as proposed by the President on April 20, 1977, in the National Energy Plan (NEP), and as passed by the Senate (H.R. 5263, Part VI); and the crude oil equalization taxes both as passed by the House (H.R. 8444) and as proposed in the NEP. In order to analyze the impacts of these measures, a modified version of the Series C Projection in the 1977 Administrator's Annual Report (AAR) is used as a reference case. The analysis assesses the impact of each measure applied as follows: conservation and solar tax credits applied to the residential and commercial sectors; petroleum and natural gas user taxes with the industrial investment tax credits in addition to the conservation and solar tax credits; and finally the above measures plus the crude oil equalization tax. (ERA citation 04:055047)

DOE/EIA-0102/9 PC **A04**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Examination of Several World Oil Price Scenarios Given Exogenous Supply and Demand Estimates. Analysis Memorandum No. AM/IA/78-21.
W. C. Kilgore, and M. Rodekohr. 31 Jul 78, 52p

An analysis of future world oil prices is documented. The analysis is based on estimates of world oil supply and demand provided by the Senate Energy and Natural Resources Committee and uses the latest Energy Information Administration (EIA) price, income, and economic feedback elasticities to forecast market clearing world oil prices for a number of different scenarios. The assumptions critical to the analysis are: the specification of the base supply and demand paths provided by the Senate Committee; the OPEC production limits as specified by the Office of International Affairs (Department of Energy); and the EIA elasticity estimates which were derived from previous simulations of the PIES, IEES, and DRI macroeconomic models. (ERA citation 04:054145)

DOE/EIA-0103/10 PC **A03**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
GASNET: Methodology Description. TM/ES/78-05.
4 Aug 78, 36p

The methodology description of the natural gas transmission model (GASNET) provides the reader with an understanding of the approach used to develop the projections and the derivation of the equations. (ERA citation 04:055092)

DOE/EIA-0103/11 PC **A02**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
GASNET: User Guide. TM/ES/78-11.
7 Aug 78, 15p

This User Guide for GASNET (the natural gas transmission model) will serve as a reference document for preparation of input data and parameters, interpretation of output, and include sufficient information for the program to be executed by an analyst. (ERA citation 04:055093)

DOE/EIA-0103/12 PC **A03**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
GASNET: Data Description. TM/ES/78-10.
4 Aug 78, 43p

All of the data files for the UPDATE75 program and the GASNET model are described. The description includes both the general format of each file along with the coding scheme utilized. (ERA citation 04:055094)

DOE/EIA-0103/15 PC **A02**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Applied Analysis Modeling Capability Survey, Models Index. Research Memorandum No. 78-09.
A. McVearry. 22 Feb 78, 18p

A listing and brief descriptions of 60 models and their submodels are presented with the Office of Energy Industry Analysis indicating the models it utilizes that are being used elsewhere in applied analysis. (ERA citation 04:055036)

DOE/EIA-0103/3 PC **A03**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
EIA Input-Output Model Simulation Procedures. Technical Memorandum TM/IA/78-03.
R. F. Earley, and M. M. Mohtadi. 31 Jul 78, 28p

The Macroeconomic Analysis Division of the Office of Integrative Analysis operates an input-output (I/O) model which simulates output and employment (jobs) for 129 sectors of the economy and employment by 470 occupational categories for the years 1980 and 1985. The Bureau of Labor Statistics I/O model is based on benchmark interindustry studies published by the Bureau of Economic Analysis (BEA) for the year 1963. A brief overview of the BEA I/O system outlining concepts characteristic of all I/O systems is presented. This is followed by a discussion of the BLS procedure for developing an I/O model capable of making projections for the years 1980 and 1985. Next, the actual simulation procedures used to generate output, employment, and occupational levels with the BLS I/O model are presented. Last, there is a discussion of some of the limitations of the methodology. (ERA citation 04:055035)

DOE/EIA-0103/32 PC **A03**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
READ Interfaces.
F. E. Hopkins, A. Parkizgari, and M. Tannen. 6 Nov 78, 47p

The energy-modeling capability of the Energy Information Administration currently suffers from an inadequate interaction between regional economic activity and regional energy demand. This weakness is primarily in the feedback from regional energy supplies, demands, and prices from the Mid-Range Energy Forecasting System to regional economic and demographic activity. The Regional Energy, Activity, and Demographic (READ) Model is being constructed to correct this problem. The structure of required interfaces between READ and other models to achieve this goal is the topic of this paper. The READ Model will provide an analytical capability for any region that can be defined as an aggregation of counties. The READ Model will provide regional forecasts of energy using activities to drive various Structural Econometric Energy Demand (SEED) Models. A list of the READ forecasted variables that can be used in the interfaces is presented. A general overview of the current and proposed EIA Mid-Range Modeling Interface system is presented. The SEED Model interfaces are described, and the use of the READ Model to drive other impact models is discussed. (ERA citation 04:053262)

DOE/EIA-0103/33(Dr) PC **A04**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
READ Model Validation Procedures.
J. Disbrow, M. Durst, and F. Hopkins. Sep 78, 57p

This paper presents a general discussion of the procedures used to validate the three areas of the Regional Energy, Activity, and Demographic model development: data and data management, software, and econometric results. Since general EIA guidelines for model validation do not currently exist, this paper may provide the basis upon which to build the guidelines. The READ model development plan, which is divided into three phases, has been designed to include an endogenous validation scheme. The first phase involves construction of a preliminary model, which while having immediate application in DOE, will also provide (1) a data base, (2) a software system, and (3) a set of well specified equations for use in the second phase of model development. The second phase of the model will build upon the results of the preliminary model. The second generation version, or full-scale READ model, will have expanded industrial, state and local government, and demographic, employment, and income sectors. The third phase of the model will consist of the addition of an environmental sector to the full READ model. (ERA citation 04:053263)

DOE/EIA-0103/35 PC **A02**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
User's Guide to the READ Estimation and Simulation Software System.
J. Disbrow, M. Durst, F. Hopkins, T. Morlan, and L. Rubin. 26 Sep 78, 25p

The Regional Energy, Activity and Demographic (READ) Model utilizes data for 11 years from 3,112 counties and for over 2500 variables. In January, 1977, the Federal Energy Administration did not

possess an econometric software and data retrieval system for efficiently meeting the data processing requirements of the READ model. This User's Guide presents a general discussion of the estimation and simulation software that has been developed since January, 1977. This system is general enough to be of use in any pooled cross-section and time-series econometric analysis. The technical level of this manual is aimed at the nonprofessional programer with a modest background in statistics. A brief description of the READ model is presented. The direct access regression preprocessor that transforms the data for use in the estimation and simulation routines is discussed. The algorithms used in the estimation and in the simulation programs are outlined. Forecasting procedures that incorporate national control totals, procedures for the adjustment of unrealistic growth rates of forecasted variables, and the relationship of the READ forecasts to the PIES scenarios are described. Finally, the information presented in the User's Guide is summarized and planned modifications to increase both the computer and the econometric efficiency of the software system are discussed. 4 figures, 2 tables. (ERA citation 04:053265)

DOE/EIA-0114/76 PC **A02**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Sales of Liquefied Petroleum Cases and Ethane in 1976.
Jan 78, 12p

Data on sales of liquified petroleum gases and ethane in 1976 are presented in tabular form. Liquefied petroleum gases include propane, normal and other butanes, isobutane, and butane-propane mixtures. Sources of these liquefied gases are natural gas processing plants, refineries, and imports. (ERA citation 04:052552)

DOE/EIA-0183/10 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Energy Demand in the Developing Countries.
J. Child, and M. Rodekohr. Apr 79, 20p

This paper presents a summary of an analysis of the demand for energy in OPEC and the non-OPEC Developing Countries. While current energy-consumption levels in these countries are relatively small, their future economic growth is expected to be above the world average; therefore, their share of world energy demand is expected to increase. Their relatively high growth rates imply that the energy demanded by these nations will become increasingly important in any future evaluation of Free World energy markets. This paper presents a new model of developing country energy demand which is econometric in nature and is designed to forecast demand for oil, coal, and natural gas - excluding non-fossil fuels. Differences between the model used for the 1977 EIA Annual Report to Congress (1977 ARC) and the new model to be used in the 1978 ARC are discussed, the new model and data used in the analysis are defined, and results generated with the 1978 model and the 1977 model based on identical sets of assumptions are compared. (ERA citation 04:055086)

DOE/EIA-0184/10 PC **A02**/MF **A01**
Energy Information Administration, Washington, DC.
Comparison of EIA and IPAA Petroleum Forecasts for 1978 and 1979. Analysis Report.
W. Trapmann. 17 Apr 79, 24p

This Analysis Report provides and compares alternate projections of petroleum supply and demand balances for the years 1978 and 1979 and contrasts all of these estimates with recently available actual data for 1978. The Independent Petroleum Association of America (IPAA) forecasts of petroleum product demands for 1979 are lower than either of the Energy Information Administration (EIA) projections particularly for residual fuel oil and minor other products. This is due mainly to the fact that IPAA assumed a lower level of economic activity for 1979. Despite the consistently higher demand for total petroleum products according to EIA, the IPAA projection of 7558 thousand barrels per day (MB/D) for motor gasoline demand is bracketed by the EIA figures for low demand, 7435 MB/D, and high demand, 7596 MB/D. Motor gasoline demand is significant since it represents almost 40% of the total demand for petroleum products. The IPAA projections fall within the EIA projection ranges for 1979 domestic crude oil production. The IPAA estimates production will be 8656 MB/D, while the EIA forecasts range from 8583 MB/D to 8808 MB/D. Alaskan crude oil production from the North Slope provides a large share of the domestic total. There is general agreement on the Alaskan projections; EIA estimates North Slope production will be 1200 Mb/D, while the IPAA figure is 1130 MB/D. The projections for petroleum imports are derived from the corresponding estimates for demand and supply. As such, the IPAA projection for 1979 imports excluding US strategic storage activities, lies below the range from the alternate EIA cases. This is attributable mainly to the higher levels of demand embodied in the latter figures. The IPAA value is 8870 MB/D, while the EIA values range from 9043 MB/D up to 9449 MB/D. In addition, the mix of imported petroleum between crude oil and refined products in the forecasts varies in each case. (ERA citation 04:049481)

DOE/EIA-0184/12 PC **A03**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Projections of US Petroleum Supply/Demand by Quarters Through 1980. Analysis Report AR/IA/79-37.
F. Hopkins, E. Nelson, S. Sitzer, and S. Wagner.
Aug 79, 49p

Revised quarterly projections for 1979 and 1980 for petroleum supply and demand are presented. The revised projections take into account important new developments in the petroleum sector, such as the mid-year OPEC price increases and recent Presidential decisions to accelerate decontrol of domestic crude oil prices and to limit the volume of US petroleum imports, and reflect recent changes in the economic outlook and the availability of petroleum supplies. (ERA citation 04:055080)

DOE/EIA-0192 PC **A99**/MF **A01**
Department of Energy, Washington, DC. Office of Consumption Data System.
Federal Energy Data System (FEDS) Statistical Summary Update.
J. P. Galliker. Jul 79, 854p

The Federal Energy Data System Statistical Summary Update displays state level energy consumption by major economic sectors for the years 1960 to 1977. The data are displayed in both calorific units (trillion Btu) and physical units. The first half of the publication displays the data in trillion Btu and the second half displays the data in physical units. This publication a revision of the Federal Energy Data System Statistical Summary which was published in February 1978. This updated version includes revised 1975 data and the addition of 1976 and 1977 data. Additional fuels have been broken out in the Update, i.e., highway gasoline in the transportation sector; kerosene in the residential sector; coking coal and petroleum coke in the industrial sector; and diesel in the transportation sector. (ERA citation 04:055126)

DOE/EIA-0194/2 PC **A05**/MF **A01**
Data Resources, Inc., Cambridge, MA.
Dynamic Generalized Equilibrium Model and Incorporation of Materials and Energy Detail.
E. A. Hudson, and D. W. Jorgenson. 30 Nov 77, 77p
Contract EM-77-I-01-8236

The extension of the 35 sector dynamic, generalized equilibrium model to incorporate detailed information on the use of materials and fuels in the economy is described. The system analyses economic activity on a sectoral basis, incorporating behaviorial submodels of producer and of consumer activity. Each of 26 materials and 12 fuel inputs will be identified and their impacts calculated. (ERA citation 04:053268)

DOE/EIA-020016-1 PC **A05**/MF **A01**
Brookhaven National Lab., Upton, NY.
Iron and Steel Industry Process Model.
F. T. Sparrow. Jul 78, 100p
Contract EY-76-C-02-0016

The model depicts expected energy-consumption characteristics of the iron and steel industry and ancillary industries for the next 25 years by means of a process model of the major steps in steelmaking from ore mining and scrap recycling to the final finishing of carbon, alloy, and stainless steel into steel products such as structural steel, slabs, plates, tubes, and bars. Two plant types are modelled: fully integrated mills and minimills. User-determined inputs into the model are: (a) projected energy materials prices for the horizon; (b) projected costs of capacity expansion and replacement; (c) energy conserving options - both operating modes and investments; (d) internal rate of return required on projects; and (e) growth in finished steel demand. Nominal input choices in the model are: DOE baseline projections for oil, gas, distillates, residuals, and electricity for energy, and 1975 actual prices for materials; actual 1975 costs; adding new technologies; 15% after taxes; and 1975 actual demand with 1.5% growth/year. Output of the model includes: energy use by type, by process, and by time period, both in total and intensity (Btu/ton); energy-conservation options chosen; and utilization rates for existing capacity, and the capacity expansion decisions of the model. (ERA citation 04:051872)

DOE/EIA/8435-1 PC **A03**/MF **A01**
Energy and Environmental Analysis, Inc., Arlington, VA.
Light Duty Vehicle Fuel Consumption Model, 1975-1986.
28 Apr 78, 28p
Contract EM-76-C-01-8435

The report summarizes the Light Duty Vehicle Fuel Consumption Model developed for the Office of Conservation and Advanced Energy Systems Policy in the Department of Energy. The purpose of the model is to estimate annual passenger auto (PA) and non-passenger auto (NPA) fuel consumption through 1986. The model is intended to: (1) provide information on future estimated petroleum demand for the majority of the US transportation sector; and (2) generate a better understanding of the trends in fuel consumption in light of fuel economy standards issued by the Department of Transportation (DOT) under the Energy Policy and Conservation Act of 1975 (EPCA). The model also is designed to provide disaggregated data for PA's and NPA's in order to anayze their relative importance in estimating total fuel consumption and to calculate the proportion of diesel, leaded, and unleaded fuels in total fleet consumption. (ERA citation 04:053398)

DOE/EIA/8560-2 PC **A17**/MF **A01**
Synergy, Inc., Washington, DC.
Regional Demand Forecasting and Simulation Model: User's Manual. Task 4, Final Report.
A. M. Parhizgari. 25 Sep 78, 381p
Contract EM-77-C-01-8560

The Department of Energy's Regional Demand Forecasting Model (RDFOR) is an econometric and simulation system designed to estimate annual fuel-sector-region specific consumption of energy for the US. Its purposes are to (1) provide the demand side of the Project Independence Evaluation System (PIES), (2) enhance our empirical insights into the structure of US energy demand, and (3) assist policymakers in their decisions on and formulations of various energy policies and/or scenarios. This report provides a self-contained user's manual for interpreting, utilizing, and implementing RDFOR simulation software packages. Chapters I and II present the theoretical structure and the simulation of RDFOR, respectively. Chapter III describes several potential scenarios which are (or have been) utilized in the RDFOR simulations. Chapter IV presents an overview of the complete software package utilized in simulation. Chapter V provides the detailed explanation and documentation of this package. The last chapter describes step-by-step implementation of the simulation package using the two scenarios detailed in Chapter III. The RDFOR model contains 14 fuels: gasoline, electricity, natural gas, distillate and residual fuels, liquid gases, jet fuel, coal, oil, petroleum products, asphalt, petroleum coke, metallurgical coal, and total fuels, spread over residential, commercial, industrial, and transportation sectors. (ERA citation 04:051771)

DOE/ERA-6391-1 PC **A11**/MF **A01**
Ernst and Ernst, Washington, DC.

Costs of Capital and Rates of Return for Industrial Firms and Class A and B Electric Utility Firms.
Jun 79, 237p
Contract EB-78-C-01-6391

The intent of the Powerplant and Industrial Fuel Use Act of 1978 (FUA) is to deter industry and electric utilities from using oil or natural gas as a primary boiler fuel. This study was undertaken to assist the Economic Regulatory Administration both in developing discount rates for use in the cost test, and in developing measures of the rate of return for use in assessing the economic health of the petitioning for exemption. The findings reported in this study were developed under a series of economic assumptions that are discussed in detail in Chapter 2. The most significant are: the assumption of rational economic behavior, the efficient market assumption, and the going concern assumption. Chapter 3 presents the methods of estimation. Cost of capital and rate of return for industrial firms (Chapter 4) and utility firms (Chapter 5) are presented. In addition, 7 technical appendices are presented to provide mathematically complex derivations and to clarify concepts and procedures. (ERA citation 04:053269)

DOE/ET/20175-1 PC **A05**/MF **A01**
Alabama Univ., Huntsville. Kenneth E. Johnson Environmental and Energy Center.
Solar Radiation Observation Stations Updated to 1979.
E. A. Carter, J. R. Cristina, and B. B. Williams.
Apr 79, 98p
Contract ET-78-S-05-5753

The type of sensing and recording equipment for 420 stations in the US are listed alphabetically by states. The stations are divided according to whether or not they are in the basic National Weather Service, NOAA, network. Reports of summarized solar radiation data are listed in an appendix. (ERA citation 04:054288)

DOE/ET/2099-T1(V.2) PC **A20**/MF **A01**
Gilbert/Commonwealth, Jackson, MI.
Factors Affecting the Potential of Direct Load Control for Non-Generating Utilities. Final Report.
Apr 79, 468p
Contract EX-76-C-01-2099

Three appendices are presented to a report (Vol. I) on a methodology for assessng the feasibility of direct load control in the environment of a non-generating electric utility. The first appendix deals with load control simulations for two urban and two rural service areas with winter or summer peak-demand seasons. The second appendix contains abstracts and data on significant water heater or central air conditioning load control tests and research programs. The final appendix discusses the operation and applicability of load control devices designed for installation at the customer's location. (ERA citation 04:053150)

DOE/ET-2720-1 PC **A04**/MF **A01**
North Dakota Regional Environmental Assessment Program, Bismarck.
ND-REAP/DOE Cooperative Project: Final Report.
Jan 79, 67p
Contract EF-77-G-01-2720

The impacts of energy-related developments in North Dakota are having profound effects on the state. Among the most significant of these effects are those on the state's economy and its population. Knowledge of the total environmental effects of development is a necessary prerequisite for effective planning and decision making. This final report addresses the conceptual design and functional evolution of the Regional Environmental Assessment Program, the results of the REAP/DOE Cooperative Effort, as well as evolution of the REAP/DOE effort and recommendations for future directions. The Economic Demographic (E-D) Model was developed to give North Dakota decision makers a tool with which to evaluate the impacts of coal development. It projects social, economic, and characteristics of North Dakota. Refinements and expansion of the model are discussed in Section 1. Section 2 provides an evaluation of the model as applied to other states. Section 3 identifies and evaluates the use of REAP data and capabilities to date. The REAP Resources Reference System R exp 3 S was developed to provide access to information systems and to past research and present studies about aspects of North Dakota. It is a computer-based library reference system. Its status and expansion potential is covered in Section 4. Section 5 makes recommendations for future efforts. (ERA citation 04:051784)

DOE/ET/83764-1 PC **A06**/MF **A01**
Science Applications, Inc., Golden, CO.
Development and Application of a Permit Information System for Shale Oil (PERMISSO). Final Report, June 1978--May 1979.
Jul 79, 116p
Contract W-31-109-ENG-38

This report covers the first phase of a program to develop an information system capable of describing and assessing the federal, state, and county permitting process for oil shale development. It was found that the permitting system is in a constant state of change and is growing in complexity. There are potential direct savings of several millions of dollars in the development and use of an automated permitting system data base. (ERA citation 04:052610)

DOE/ET/83764-1(App.) PC **A21**/MF **A01**
Science Applications, Inc., Golden, CO.
Development and Application of a Permit Information System for Shale Oil (PERMISSO). Final Report Appendix: Summary Sheets of Regulations Required for Oil Shale Development, June 1978--May 1979.
Jul 79, 485p
Contract W-31-109-ENG-38

This appendix is comprised of summaries of various governmental permits, licenses and other approvals required for oil shale development. The summaries were completed during the period June--October 1978, and are current as of July 1, 1978, although more recent authority was cited in some cases. One of the major purposes of Phase II of the project will be to update these summaries as statutes and regulations are added, changed or eliminated. This updating will be particularly important in the case of environmental permits and approvals. Many legislative and regulatory changes affecting environmental requirements are pending at this time and will alter many of the summaries herein. In addition, many regulatory proposals have been or likely will be challenged in the courts. When such conflicts are resolved further changes may be in order. (ERA citation 04:052611)

DOE/IA-0002/02 PC **A10**/MF **A01**
Department of Energy, Washington, DC.
Joint Egypt/United States Report on Egypt/United States Cooperative Energy Assessment. Volume 2 of 5 Vols. Annex 1.
Apr 79, 215p

Detailed summaries are presented of Egypt's indigenous energy resources from the U.S. Geological Survey assessments; preliminary information collected early in 1977 from files, reports, and publications existing in the U.S.; and data gathered during one-month assessment program in March--April 1978. Detailed reports are given on oil and gas, coal and oil shale, uranium and thorium, geothermal energy, water resources, and energy-related minerals/commodities. An assessment of cement-making materials, iron ore, manganese, aluminium, barite, bentonite, copper, chromium, nickel, titanium, and miscellaneous metals used in steel making is presented. (ERA citation 04:050194)

DOE/JPL-1024-78/1 PC **A05**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Fixed Tilt Solar Collector Employing Reversible Vee-Trough Reflectors and Evacuated Tube Receivers for Solar Heating and Cooling Systems. Final Report, Phase II Data Acquisition.
M. K. Selcuk. 15 Oct 78, 96p JPL-PUB-78-106
Contract EX-76-A-29-1024

The objective of the Vee-Trough/Evacuated Tube Collector (VTETC) Project, undertaken for the DOE Solar Heating and Cooling Branch, was to show how vee-trough concentrators could improve the heat collection capability and reduce the cost of collectors consisting of evacuated tube receivers. The work was carried out in two phases. During the first phase, the VTETC was analyzed rigorously and various mathematical models were developed to calculate the optical performance of the vee-trough concentrators and the thermal performance of the evacuated tube receivers. A test bed was constructed to verify the mathematical analyses and compare reflectors made of back-silvered glass mirror, Alzak, Aluminized Teflon, and Kinglux (an electro polished aluminum reflector). Testing was conducted and data was obtained for the months of April to August 1977. The results of the mathematical analyses, as well as the results from 1977, were reported in DOE/JPL/1024-1, published in January 1978. In the sccond phase, additional tests were run at temperatures ranging from 80 to 190 exp 0 C (176 to 374 exp 0 F) during the months of April, May, June, and July 1978. The results obtained compared well with theoretical predictions. For the glass mirror reflectors, peak efficiencies, based on aperture area and operating temperatures of 125 exp 0 C (257 exp 0 F), were over 40%. Efficiencies of about 40% were observed at temperatures of 150 exp 0 C (302 exp 0 F) and 30% at 175 exp 0 C (347 exp 0 F). Test data covering a complete day are presented for selected dates throughout the test season. Predicted daily useful heats collected and efficiency values are presented for a full year. These theoretical values are then compared with actual data points for the same temperature range. (ERA citation 04:052969)

DOE/NASA/CR-150523 PC **A02**/MF **A01**
Wyle Labs., Huntsville, AL. Solar Energy Systems Div.
Long-Term Weathering Effects on the Thermal Performance of the Solargenics (Liquid) Solar Collector at Outdoor Conditions.
Jul 79, 14p
Contract EX-76-A-29-1037

The test procedures used and the results obtained during the evaluation test program of the Solargenics single-covered liquid solar collector are presented. The tests were performed under outdoor natural conditions at the Solar Test Facility at MSFC, following long-term exposure to natural weathering conditions. The collector was under stagnation conditions from August 26, 1978, to June 13, 1979, for a total of approximately ten months. The Solargenics solar collector is a liquid, single-glazed, flat-plate collector, and is about 240 inches long, 38 inches wide, and 3.8 inches in depth. (ERA citation 04:052970)

DOE/NASA/CR-150666 PC **A03**/MF **A01**
Wyle Labs., Huntsville, AL. Solar Energy Systems Div.
Indoor Test for Thermal Performance Evaluation on the Sunworks (Air) Solar Collector.
Jan 78, 36p
Contract EX-76-A-29-1037

The test procedure used and the results obtained from an evaluation test program conducted to obtain thermal performance data on a Sunworks single-glazed air solar collector under simulated conditions are described. These tests were made using the Marshall Space Flight Center's solar simulator. A time constant test and incident angle modifier test were also conducted to determine the transient effect and the incident angle effect on the collector. These results and the results of the collector load test are also discussed. The Sunworks "Selector" solar energy collector is an air-type, single-glazed flat plate. The absorber is copper sheet with selective black coating. Outside dimensions are 36 inches by 84 inches by 4 inches. Collector weight is 111 pounds. (ERA citation 04:026082)

DOE/NASA/CR-150712 PC **A03**/MF **A01**
Northrup, Inc., Hutchins, TX.
Development and Fabrication of a Concentrating Solar Collector Subsystem. Second Quarterly Report.
Apr 77, 36p
Contract EX-76-A-29-1037

The progress of work from January 1, 1977, through March 31, 1977 is covered, including work

on the evacuated receiver, lens design, lens die fabrication, and improvements on components, production techniques, and performance testing. (ERA citation 04:026083)

DOE/NASA/CR-161164 PC **A09**/MF **A01**
Northrup, Inc., Hutchins, TX.
Certification and Verification for Northrup Model NSC-01-0732 Fresnel Lens Concentrating Solar Collector.
Mar 79, 182p
Contract EX-76-A-29-1037

The certification and verification of the Northrup Model NSC-01-0732 Fresnel lens tracking solar collector are presented. A certification statement is included with signatures and a separate report on the structural analysis of the collector system. System verification against the Interim Performance Criteria are indicated by matrices with verification discussion, analysis, and enclosed test results. (ERA citation 04:054476)

DOE/NASA/CR-161290 PC **A03**/MF **A01**
Alabama Univ., University. Dept. of Physics and Astronomy.
Development of Surfaces Optically Suitable for Flat Solar Panels. Final Report.
Aug 79, 45p
Contracts EX-76-A-29-1037, EG-77-S-05-5362

This final report contains three principal items. The first describes a simple and novel reflectometer which can separately evaluate the spectral and diffuse reflectivities of surfaces. A phase locked detection system for the reflectometer is also described. The second item is a selective coating on aluminium potentially useful for flat-plate solar collector applications. The coating is composed of strongly bound copper oxide (divalent) and is formed by an etching process performed on an aluminium alloy with high copper content. Because of this one step fabrication process, fabrication costs are expected to be small. Process parameters, however, need further definition. The third item contains conclusions gleaned from the literature as to the required optical properties of flat plate solar collectors. (ERA citation 04:054477)

DOE/NASA/TM-73398 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Huntsville, AL. George C. Marshall Space Flight Center.
Solar Energy Bibliography.
S. Gargus. Jul 77, 32p
Contract EX-76-A-29-1037

Technical briefs, reports, and papers pertaining to reseach being performed by MSFC personnel and contractors in the field of solar energy are listed. (ERA citation 04:025796)

DOE/S-0005 PC **A03**/MF **A01**
Federal Energy Management Program, Washington, DC.
Energy Management in the Federal Government. Annual Report, to the President of the United States, Fiscal Year 1977.
Aug 78, 38p

This report summarizes the Federal government accomplishments in energy conservation since FY 1975. The Federal energy conservation effort is monitored by the Department of Energy through the Federal Energy Management Program and involves the contribution of 66 Federal agencies. This report is based on the best available data obtained from agency annual reports submitted to the Department of Energy in accordance with the reporting requirements of Section 2 of the Executive Order, from agency quarterly energy use reports, and from studies and analyses prepared by DOE. The individual agency annual reports contain program information from which the highlights presented in this document have been extracted. Following an introductory chapter, the Federal energy picture; the Federal Energy Management Program (energy management in general operations, energy management in buildings, related programs); program highlights; and future activities are presented. (ERA citation 04:051797)

DOE/TIC-10172 PC **A06**/MF **A01**
Alabama Energy Management Board, Montgomery.
Implementation Plan for Alabama Energy Extension Service.
9 Dec 77, 111p
Contract EC-77-G-01-5091

Exhibits are presented that describe the implementation plan for the state of Alabama's Energy Extension Service. Programs include areas of car care clinics, fuel substitution/utilization, boiler/water heater efficiency improvement program, efficient use of energy in agriculture, energy systems for low income groups, residential energy conservation information service program services and technical support, burning fuel more efficiently in the home. Information on these programs is presented in the following Exhibits: Program Services and Technical Support; Rate of Service Activity; Milestone Schedule, Quarterly Target Reports; Market Factors Feedback Plan; Budgets; and Publications/Materials. (ERA citation 04:048755)

DOE/TIC-10173 PC **A05**/MF **A01**
New Mexico Energy Resources Board, Santa Fe.
New Mexico EES Implementation Plan. Final Version.
20 Dec 77, 90p
Contract EC-77-G-01-5093
Portions of document are illegible.

Seven exhibits are presented in this final implementation plan for New Mexico EES. The only major change from the original proposal is in the area of the budget in the agriculture, small business, and residential sectors. The exhibits are State EES Program and Technical Support, Rate of Service Activity, Market Factors Feedback Plan, Budget Table, Milestone Schedule, Quarterly Target Report, and Publications/Materials Schedule. (ERA citation 04:048756)

DOE/TIC-10174 PC **A06**/MF **A01**
Texas Energy Extension Service, College Station.
Implementation Plan for the Texas Energy Extension Service.
Dec 77, 102p
Contract EC-77-G-01-5096

This publication presents compiled data concerning the Energy Extension Service of Texas. Exhibit 1 presents information on program services and technical support for various areas in Texas. Exhibit 2 presents projected rate of service activity (speakers, on-site visits, workshops on energy management and energy conservation). Exhibit 3 summarizes market factors feedback plan for various buildings. Exhibit 4 is to be issued later, and Exhibit 5 tabulates the budget data. Exhibit 6 is the milestone schedules while Exhibit 7 is the quarterly target reports. The schedule for publication/materials is given for Exhibit 8. (ERA citation 04:050172)

DOE/TIC-10175 PC **A10**/MF **A01**
Michigan Energy Administration, Lansing.
C.E.S. Implementation Plan.
16 Dec 77, 208p
Contract EC-77-G-01-5092

The publication summarizes intensive communication and cooperative planning between the Michigan Energy Extension Service office and the offices of the prime contracting units (C.E.S./M.S.U.–E.R.I.M.). Information is outlined on deviations made from the original proposals. Data on the Cooperative Extension Service Implementation Plan are tabulated and cover the following: C.E.S. Implementation Plan; ERIM/SEMTAP Implementation Plan for Small Businesses and Implementors; Clearinghouse Implementation Plan. Tables on program services and technical support, projected rates of service activity, milestone schedule, and publications and materials are given for each. Additional data and facts on market factors feedback, State's Independent Evaluation Plan, Budget, and quarterly targets are given. (ERA citation 04:050173)

DOE/TIC-10176 PC **A06**/MF **A01**
Pennsylvania Governor's Energy Council, Harrisburg.
Pennsylvania Energy Extension Service.
31 Oct 77, 102p
Contract EC-77-G-01-5094

Since the budget table (Exhibit 5) is central to the entire program rather than the individual modules, it is presented in only this section. Similarly, Sections A, C, and D of the milestone schedule (Exhibit 6) are central to the entire program and are included only in this section. Part I of this document is entitled: Implementation Plan: General Documents. Part II, Statewide Program Implementation Plan, contains the following: Pennsylvania Technical Assistance Program; Department of Community Affairs; and University of Pittsburgh/Hospital Council of Western Pennsylvania. The Geographic Intensive Program Implementation Plan contains data and facts on Core Group; Management Group; Berks County; McKeesport Housing Authority--Governoring Board and Staff; McKeesport Housing Authority--Tenants; Centre Region Council of Governments; Carlisle Borough and School District; Lehigh/Northhampton Counties; and Southern Alleghenies Planning and Development Commission. (ERA citation 04:050174)

DOE/TIC-10180 PC **A03**/MF **A01**
Wisconsin Energy Extension Service Administration, Madison.
Wisconsin Energy Extension Service Implementation Plan.
9 Dec 77, 46p

As part of an effort to lower energy consumption levels among individuals and small establishments that use energy, The Energy Extension Service, operating in ten pilot states, has implemented programs which focus on the particular needs of small businesses. These programs have been developed to deliver a range of services to the many different kinds of enterprises which fit into the small business category. The programs currently operating in the ten pilot states are described and examples are given. In Alabama, Auburn University provides information and analyses to test the feasibility of using alternative fuels for small businesses. In Connecticut, the Department of Commerce provides audits to businesses throughout the State. In Michigan, the Department of Commerce, through two contractors, provides seminars to one tenth of the small businesses in southeastern Michigan. In New Mexico, the small business program provides demonstration audits of small businesses using alternative energy sources. In Pennsylvania, EES, in connection with the Pennsylvania State University, provides technical assistance to small businesses throughout the State. In Tennessee, the program provides audits, seminars, and counseling services to small businesses in three of that state's counties. In Texas, the Texas A and M College of Engineering operates an information retrieval system for small manufacturers through a bi-monthly bulletin. In Seattle, Washington, the small business program provides audits to Mom and Pop type businesses in two of that city's neighborhoods. In Wisconsin, the University of Wisconsin provides seminars and audits to hospitality industry businesses. In Wyoming, the small business program provides seminars to firms in the building industry. (ERA citation 04:050277)

DOE/TIC-10183 PC **A03**/MF **A01**
Orkand Corp., Silver Spring, MD.
Issues and Lessons Learned in Planning and Implementing Energy Extension Service Local Government Programs: Some Case Examples.
May 79, 38p

At the present time, EES programs specifically directed at local government are operating in 6 of the 10 pilot states. These programs in Connecticut, New Mexico, Pennsylvania, Tennessee, Texas, and Wisconsin are described. In two other states, Alabama and Washington, EES and local governments cooperate to enhance their outreach efforts to residential, commercial, and industrial audiences. In Michigan and Wyoming, the remaining EES pilot states, local government activity by EES is minimal or non-existent. In Michigan, EES resources are committed to reaching other target groups since there is a state program for local governments that was already in operation before EES was established. Similarly, in Wyoming, EES focuses on target groups other than local governments. This case study provides information on the activities of each of the pilot states with respect to establishing local government programs. (ERA citation 04:050175)

DOE/TIC-10206 PC **A02**/MF **A01**
National Congress of Petroleum Retailers, Washington, DC.

Energy Cost Reduction for Gasoline Service Stations.
12 Jul 77, 25p

The handbook is provided to help gasoline service stations cut the cost of energy in their business establishments. It shows how to recognize and act on energy waste in interior and exterior lighting, space heating, and general station maintenance. Most of the energy use in gasoline stations is for lighting and heating. Lighting for interiors, storage areas, and general station exterior may consume from 30 to 70% of total energy costs. Heat and air conditioning costs make up most of the remaining energy outlay. A 15 to 25% cost reduction is possible by applying the recommendations in this handbook. (ERA citation 04:051862)

DOE/TIC-10207 PC **A05**/MF **A01**
American Retail Federation, Washington, DC.
Energy Cost Reduction in Retailing.
76p

The handbook was developed to help retail store owners cut the cost of energy in their businesses. It shows how to recognize and act on energy waste in interior and outdoor lighting, space heating, air conditioning and ventilation, general maintenance, warehousing, delivery, and refrigeration. Energy use in retail stores is significant because of the importance of environmental control, the role of lighting in merchandising, and long hours of operation. A 20 to 30% net cost reduction is possible by applying the recommendations in this handbook. (ERA citation 04:051863)

DOE/TIC-10325 PC **A04**/MF **A01**
National Association of Counties, Washington, DC.
National Association of Counties. Final Report for the Period July 1, 1976 Through March 31, 1977.
1977, 58p

This study was undertaken by the National Association of Counties Research Foundation to determine what effects thermal codes have had on counties. Public Law 94-385 requires states and localities to adopt, by 1981, thermal efficiency codes no less stringent than ASHRAE 90-75. The data assembled in this report supports three important conclusions: counties have the capacity to implement state energy codes on time and in a workmanship manner; the data is a composite of the experience obtained from field trips; and the dynamic nature of the energy conservation arena is shown. The need for fathering further information is indicated. Four exhibits are included: Selection Criteria, Monthly Reports, photocopies of written comments on the report, and a summary of Task Force meeting of September 1976 and March 1977. (ERA citation 04:048758)

DOE/TIC-10448 PC **A05**/MF **A01**
Federal Energy Administration, Washington, DC.
Task Force on Compliance and Enforcement. Final Report.
13 Jul 77, 90p

The report of Chairman Stanley Sporkin is presented. Thirteen basic findings and conclusions are reviewed in order to determine what new measures are called for. The Task Force initiated its discussions on May 13 and its efforts were organized into 5 major study areas. An overview of the FEA compliance and enforcement program was given and followed by summaries of recommendations on pending cases, compliance program organization, enforcement powers, compliance strategy, and audit staffing and techniques. (ERA citation 04:048768)

DOE/TIC-10479 PC **A02**/MF **A01**
Federal Energy Administration, Washington, DC.
Preliminary Economic Impact Evaluation of Proposed Rulemaking to Amend Provisions of the Domestic Crude Oil Allocation Program Relating to Imports of Residual Fuel Oil.
Jan 77, 20p

The proposed rulemaking would amend provisions of the Old Oil Allocation Program, (entitlements program), in order to modify the existing scheme of awarding entitlements for certain importations of residual fuel oil. Purpose is to ameliorate the problems that have been encountered since the adoption of the modifications to the entitlements program in March 1976. This evaluation first considers the economic impacts of the existing system as compared to the system that preceded it. Then the inflationary and other economic impacts of the proposal are considered so that comparisons can be made between the changes proposed and the relevant alternatives. (ERA citation 04:052560)

DOE/TIC-10483 PC **A05**/MF **A01**
Federal Energy Administration, Washington, DC.
Proposed Gasoline and Diesel Fuel Rationing Contingency Plan. Management Summary.
Apr 77, 84p

The objectives of the rationing plan are described in Section A. Other areas discussed are: conditions leading to rationing; gasoline rationing plan operations; diesel fuel rationing plan operations; program administration and resources; rationing implementation plan. (ERA citation 04:050195)

DOE/TIC-10525 PC **A03**/MF **A01**
Department of Energy, Washington, DC.
Department of Energy Organization and Functions Fact Book.
Sep 77, 45p

The creation of the Department of Energy, its functions, and the functions of the agencies in it are discussed. The staff and their responsibilities are delineated. (ERA citation 04:051763)

DOE/TIC-10529 PC **A07**/MF **A01**
Ideamatics, Inc., Washington, DC.
Handbook of Draft Standard Energy Data Elements.
11 May 77, 135p

The handbook documents the definitions devised from the examination of similar data elements in the ten energy data systems chosen for analysis in the pilot study to evaluate the energy data element standardization problem. It addresses the standardization of data element and terminology definition; data element and terminology codes; nomenclature standards; data element and data item format description standards; survey questionnaire design standards; conversion factors; units of measure; publication standards; and methodology. The handbook is divided into four sections: (1) Index (alphabetical by data element name, within data systems recommended for usage, and by functional category of data element usage); (2) standard energy data element defintion sheets; (3) bibliographic term analysis; and (4) sample form anlysis. (ERA citation 04:051764)

DOE/TIC-10620 PC **A13**/MF **A01**
JRB Associates, Inc., McLean, VA.
Analysis of Federal Agency Energy Conservation Programs and Target Recommendations.
Jul 77, 297p

Among the items contained in the November 4, 1976, Presidential Memorandum giving direction to the Federal Energy Management Program (FEMP) was an instruction to the Federal Energy Administration (FEA) to work with the Federal agencies to establish individual agency targets ... to assure the overall Executive Branch goals are met. The agency targets are the specific agency energy use levels for FY 1977. The goal is to keep the overall Federal government energy use level for FY 1977 at the FY 1975 level. This report is prepared as a background information document to assist FEA in their tasks pursuant to the Memorandum. It contains a profile of energy-conservation programs and past energy use by 27 Federal agencies, an analysis of energy-conservation accomplishments to date, and potential for further achievements in energy conservation. Some suggestions are also presented as to possible factors to consider in establishing individual target-agency energy-use levels. (ERA citation 04:046800)

DOE/TIC-10667 PC **A03**/MF **A01**
Federal Energy Administration, Washington, DC.
Proposed Energy Conservation Contingency Plan: Emergency Heating, Cooling and Hot Water Restrictions; Authorities - Need, Rationale, Operation.
Apr 77, 28p

A proposed energy conservation contingency plan is reviewed. The plan is intended for implementation only in the event of a severe energy interruption or in order to fulfill obligations of the US under the International Energy Program. In the event of a severe petroleum shortage, three types of actions are available to alleviate the adverse impact: actions to increase domestic petroleum supplies and use alternative forms of energy; actions to distribute the available supply in an equitable manner; and actions to reduce public and private demand for energy. (ERA citation 04:048818)

DOE/TIC-10681 PC **A02**/MF **A01**
Federal Energy Administration, Washington, DC. Office of Energy Conservation and Environment.
Environmental Impact Determination: Submitted to FEA by The State of North Carolina for Approval and Funding under the Provisions of Title III, Part C of the Energy Policy and Conservation Act; State Energy Conservation Program.
18p

A review of North Carolina's proposed conservation plan was completed. The target of the North Carolina plan, as a whole, is to reduce the State's 1980 energy consumption by 98.87 trillion Btu. This, measured against the 1980 baseline projection for North Carolina of 1736.08 trillion Btu equals a 5.69% savings. Approximately 20.503 trillion Btu (20.7%) of North Carolina's savings come from the five required program measures, which involve state building codes and thermal-efficiency standards, lighting standards for public buildings, life-cycle-cost analysis, increase in transit level of transportation systems, right turn on red. The savings, measured across end-use sectors, resulted in an absolute decrease in every environmental residual measured from each fuel consumed within each sector. (ERA citation 04:050177)

DOE/TIC-10682 PC **A02**/MF **A01**
Federal Energy Administration, Washington, DC. Office of Energy Conservation and Environment.
Environmental Impact Determination: Submitted to FEA by The State of New Jersey for Approval and Funding under the Provisions of Title III, Part C of the Energy Policy and Conservation Act; State Energy Conservation Program.
19p

A review of New Jersey's proposed conservation plan was completed, and it was concluded that no significant adverse environmental impacts are expected to result from plan implementation and that beneficial environmental impacts outweigh adverse impacts. The target of the New Jersey plan is to reduce the state's 1980 energy consumption by 139.25 trillion Btu. This, measured against the 1980 baseline projection for New Jersey of 1946.44 trillion equals a 7.15% savings. Savings from the five required program measures will amount to 5.135 trillion Btu. It is seen that the residential and commercial sectors account for 47.3% of New Jersey's total energy consumption and about 62.3% of the projected savings will come from this area. The industrial sector is responsible for 22.1% and about 23.1% of projected savings will amount to about 23.1% while transportation uses about 30.6% of total consumption and savings in this area will amount to 10.2%. About 29% of fuels consumed are for the purpose of generating electricity purchased by the residential, commercial, and industrial sectors. (ERA citation 04:050178)

DOE/TIC-10694 PC **A02**/MF **A01**
Federal Energy Administration, Washington, DC.
Environmental Impact Determination: Submitted to the FEA by the State of Massachusetts for Approval and Funding under the Provisions of Title III, Part C of the Energy Policy and Conservation Act; State Energy Conservation Program.
18p

A review of Massachusetts' proposed conservation plan was completed. The impact of the Massachusetts plan, as a whole, will be - if successful - to reduce the State's 1980 energy consumption by 121.31 trillion (10 exp 12) Btu; of this 70.45 x 10 exp 12 Btu will be non-electrical and 50.86 x 10 exp 12 Btu will come from fuels used to generate electricity. This, measured against the FEA 1960 Baseline projection for Massachusetts of 1,683 tril-

lion Btu, equals a 7.2% savings. No significant adverse environmental impacts were expected from implementation of the plan. (ERA citation 04:050182)

DOE/TIC-10695 PC **A02**/MF **A01**
Federal Energy Administration, Washington, DC.
Environmental Impact Determination: Submitted to the FEA by the State of Colorado for Approval and Funding under the Provisions of Title III, Part C of the Energy Policy and Conservation Act; State Energy Conservation Program.
22p

A review of Colorado's proposed conservation plan was completed. The target of the Colorado plan, as a whole, is to reduce the State's 1980 energy consumption by 64.43 trillion Btu. This, measured against the 1980 baseline projection for Colorado of 934.04 trillion Btu equals a 6.9% savings. Approximately 13.50 trillion Btu (21.0%) of Colorado's savings come from the five required program measures, which involve state building codes and thermal efficiency standards, lighting standards for public buildings, life cycle cost analysis (procurement), increase in transit level of transportation systems, right turn on red. These savings, measured across end use sectors, result in an absolute decrease in every environmental residual measured from each fuel consumed within each sector. (ERA citation 04:050183)

DOE/TIC-10703 PC **A02**/MF **A01**
Federal Energy Administration, Washington, DC.
Environmental Impact Determination: Submitted to FEA by the State of North Dakota for Approval and Fundng under the Provisions of Title III, Part C of the Energy Policy and Conservation Act; State Energy Conservation Program.
16p

A review of North Dakota's proposed conservation plan was completed. The target of the North Dakota plan, as a whole, is to reduce the State's 1980 energy consumption by 12.31 trillion Btu. This, measured against the 1980 baseline projection for North Dakota of 164.55 trillion Btu equals a 7.48% savings. Approximately 2.37 trillion Btu (19.26%) of North Dakota's savings will come from the five required program measures, which involve state building codes and thermal efficiency standards, lighting standards for public buildings, life cycle cost analysis (procurement), increase in transit level of transportation, and right turn on red. No significant adverse environmental impacts were expected from implementation of the plan. (ERA citation 04:050191)

DOE/TIC-10739 PC **A03**/MF **A01**
Cambridge Systematics, Inc., MA.
Tests of Transferability and Validation of Disaggregate Behavioral Demand Models for Evaluating the Energy Conservation Potential of Alternative Transportation Policies in Nine US Cities. Final Report.
Apr 77, 40p

A transportation policy analysis methodology described in Guidelines for Travel Demand Analyses of Program Measures to Promote Carpools, Vanpools, and Public Transportation, November, 1976 (EAPA 4:1921) is demonstrated. The results reported build upon the two levels of analysis capabilities (a fully calibrated and operational computer package based on a set of disaggregate travel demand models that were estimated on a random sample of urban travelers and a manual procedure or sketch planning pivot-point version of the above methodology) and have undertaken to accomplish the following objectives: transferability, testing the manual approach on actual applications, and validating the method. The first objective was investigated by examining and comparing disaggregate models that were estimated in 7 US cities by eight different organizations. The next two objectives were investigated using separate case studies: the Washington, DC, Shirley Highway preferential transit and carpool lanes; the Portland, Oregon, Banfield Highway Expressway preferential transit and carpool lanes; the Los Angeles, Santa Monica Freeway preferential Diamond Lane and ramp metering facilities for transit and carpools; the Minneapolis, express bus on metered freeway project; and the Portland, Oregon, carpool matching and promotion programs for the general public and for employer-based groups. Principal findings are summarized and results consolidated. (ERA citation 04:048843)

EPRI-EA-1086 PC **A09**/MF **A01**
Charles River Associates, Inc., Boston, MA.
Design for Coal Supply Analysis System. Final Report.
May 79, 198p

Coal supply forecasts are used by EPRI to assess the potential of new technologies and by member utilities for strategic planning. Developing realistic coal price--quantity relationships for technology assessment is one type of activity in the EPRI Energy Supply Program, and providing information on coal markets and coal forecasts to member utilities is another. To support activies such as these, EPRI is developing a computerized Coal Supply Analysis System (CSAS). The CSAS contains procedures for developing coal analyses and a data base to support them. The procedures include methods to estimate available coal resources, coal extraction costs, coal preparation costs, and regional coal supply functions, and to support price and production forecasts. The basic data base includes information on coal resources (resources, production), coal mining technology, and coal prices. Procedures are supported by data bases containing information developed from the basic data files or from other procedures in CSAS or other systems (demand, transport). Because CSAS supports analyses produced on a regular basis as well as special analyses, the system should provide flexibility for unanticipated analyses as well as cost-effective methods for frequently used procedures.To provide this capability, there should be a flexible data base management system, a variety of programming languages under a common operating sytem, and the ability to access nonresident programs. (ERA citation 04:049469)

EPRI-EA-1108 PC **A05**/MF **A01**
Fletcher (A.L.) and Associates, Columbia, SC.
Evaluation of the Pseudo-Data Approach. Final Report.
G. S. Maddala, and R. B. Roberts. Jul 79, 78p

The pseudo-data approach has been developed for long-run energy modeling. The term pseudo-data is misleading because it implies something counterfeit or spurious. The pseudo-data approach is not properly described by these adjectives. The fact is that the pseudo-data are generated from detailed engineering process models and do reflect real world technology. A more descriptive term for the analytical process would be single-equation summarization of process-analysis models. This report presents a critical appraisal of this method. The results of this evaluation are that such single equation summarization is not feasible nor desirable because it results in a loss of vital information. The procedure used in generating the data points (so as to avoid the problem of multicollinearity) is not a useful one. There are two aspects of the approximation issue: (a) How well do the data points chosen approximate the true production surface; and (b) How well does the approximating function approximate the particular set of points chosen. Too much attention has been given to the second problem and too little to the first. (ERA citation 04:055038)

EPRI-EA-1115 PC **A05**/MF **A01**
Wharton Econometric Forecasting Associates, Inc., Philadelphia, PA.
Wharton Annual Energy Model: Development and Simulation Results. Final Report.
W. Finan, and G. R. Schink. Jul 79, 92p

This project has sponsored an extensive and detailed expansion of the energy sector of a well-known, commercially available macroeconomic model. The research was undertaken primarily in order to develop a tool for examining future energy-economy interactions. The current report reviews the development of modifications in the model and describes the specific methodologies employed. A set of energy policy simulations using the newly expanded model is also presented. (ERA citation 04:053266)

ERDA-77-76/1 PC **A03**/MF **A01**
Energy Research and Development Administration, Washington, DC. Div. of Basic Energy Sciences.
Materials Sciences Overview. I. Executive Summary. A Series of Workshops Recommending Future Directions in Energy-Related Basic Materials Research.
W. L. Clinton, J. R. Cost, and L. C. Ianniello. Aug 77, 28p

A summary is presented of the reports of nine workshops held in the spring of 1977 to ascertain new directions and priorities in energy related basic research for ERDA's materials sciences program. (ERA citation 04:027057)

GJBX-108(79) PC **A02**/MF **A01**
Department of Energy, Grand Junction, CO. Grand Junction Office.
Selected References on Uranium Geology and Potential Resources of Uranium.
W. L. Chenoweth, and E. A. Learned. Apr 79, 23p
Contract EY-76-C-13-1664

This selected list is an update from the list in the publication GJO-111(76) National Uranium Resource Evaluation, Preliminary Report. No reports dealing with aerial surveys and the hydrogeochemical and stream-sediment reconnaissance are included here. A complete list of reports generated by the NURE program are included in GJO-111(79) National Uranium Resource Evaluation, Interim Report. (ERA citation 04:051139)

HCP/I5725-01 PC **A08**/MF **A01**
Wharton Econometric Forecasting Associates, Inc., Philadelphia, PA.
Simulation Study of Eight Petroleum Supply Disruption Scenarios.
G. R. Schink. Apr 79, 151p
Contract EI-78-X-01-5725

The cost of an oil embargo in terms of lost real output (GNP) is less than proportional to the reduction in oil supplies but still substantial. As the size of the oil embargo increases, the percentage loss in GNP increases relative to the percentage loss in oil supplies (a nonlinear relationship). Price levels increase during an embargo partly in response to higher world oil prices and partly as a result of the disruption (inefficiency) inherent in any supply constrained situation. While standard capacity utilization measures would fall during an embargo, there would be no incentive to cut prices because output would be limited by oil inputs. (In general, firms would be producing all they could produce). (ERA citation 04:052554)

HCP/M1693-03 PC **A11**/MF **A01**
Booz, Allen and Hamilton, Inc., Bethesda, MD.
Alternative Metering Practices: Implications for Conservation in Multifamily Residences.
Jun 79, 227p
Contract EC-77-C-03-1693

The effects of single unit metering, submetering and master metering of electricity and natural gas consumption in multi-unit dwellings on energy conservation, the effect of the Public Utility Regulatory Act of 1978 on metering practices, policy and institutional issues associated with metering, and the economic and technical optimization of utility metering methods are examined in detail. It is concluded that any comprehensive metering policy should allow individual, submetering, and master metering because each has a role to play in promoting more efficient energy use in multifamily buildings. (ERA citation 04:053389)

IDO-1655-1(V.1) PC **A02**/MF **A01**
Honeywell, Inc., Minneapolis, MN. Energy Resources Center.
Energy Integrated Industrial Park Concept Development Study. Volume I. Executive Summary. Final Report.
Nov 78, 16p
Contract EC-77-C-07-1655

The Energy Integrated Industrial Park Concept Development Study was initiated to provide information to industry about cost-effective methods of reducing energy consumption. In the concept, a number of industries co-locate within an industrial

park for the purpose of making better use of the thermodynamic availability of fossil fuel, increasing waste energy recovery, sharing common water and waste water treatment facilities, and sharing industrial by-products. The industrial sector was divided into six classes of industry. Four discrete integration concepts were defined in the initial stages of the study. These are: central power generation (all of the process steam and/or electrical power requirements of the industries in a park are supplied by a central fossil-fuel-fired facility); central intensive (heat is recovered in the form of steam from high temperature process exhaust gases of one industry, upgraded as necessary, and distributed for process use to one or more different user industries); centralized systems (heat is recovered from several waste streams of each of the participating industries, transported to a central point, upgraded, converted to steam and electricity, and distributed back to the user industries); and cascade (high quality waste heat is recovered from one industry and used by another; and the lower quality waste heat from the latter industry is recovered and used to supply some or all of another industry's energy requirements, etc.). A hybrid combination consisting of combining two or more of the four primary concepts was evaluated. Results are given for each of these concepts after each was evaluated for typical: installation and operating costs, reductions of energy consumption credited to the member industries, and economic benefits accruing to the member industries. (ERA citation 04:053400)

IDO-1655-1(V.2) PC **A10**/MF **A01**
Honeywell, Inc., Minneapolis, MN. Energy Resources Center.
Energy Integrated Industrial Park Concept Development Study. Volume II. Detailed Results. Final Report.
Nov 78, 215p
Contract EC-77-C-07-1655

A feasibility study is made of an energy integrated industrial park concept to provide DOE and industry the direction to pursue the concept. The concept consists of industries co-located within an industrial park and interconnected to minimize raw energy inputs. Under this concept, the use of fossil fuels would be reduced by using waste energy streams of industries as fuel inputs to other industries and providing on-site power generation capability and using the waste energy stream more efficiently. The method of selecting industries at the 4-digit SIC level, representative of the industrial sector from surveying all 3-digit SIC industries and classifying them with respect to energy use and waste stream characteristics, is described. Those selected were analyzed in detail to describe energy input requirements and waste stream characteristics for each process within the industry. The study is concerned with more than technical and economic feasibility of each concept; it is also concerned with the nontechnical issues that will strongly affect the perceived feasibility of the various integration concepts. Other issues are: management, operation, and financing options; impact of incorporating nonenergy utilities and services; and constraints on, risks in, and incentives for development of EIIP concepts. (ERA citation 04:053401)

IDO-1655-1(V.3) PC **A12**/MF **A01**
Honeywell, Inc., Minneapolis, MN. Energy Resources Center.
Energy Integrated Industrial Park Concept Development Study. Volume III. Appendices. Final Report.
Nov 78, 257p
Contract EC-77-C-07-1655

The Energy Integrated Industrial Park Concept Development Study was initiated to provide information to industry about cost-effective methods of reducing energy consumption. A number of industries co-locate within an industrial park for the purpose of making better use of the thermodynamic availability of fossil fuel, increasing waste energy recovery, sharing common water and waste water treatment facilities, and sharing industrial by-products. Volume III contains 8 appendices. Appendix A describes the detail of the 2-digit and 3-digit SIC analyses of representative industries chosen while representative industry descriptors are presented in Appendix B. Additional appendices are: Fuel Price Data; Life-Cycle Cost Model; Industrial Energy Conservation and Goals; Industrial Interviews; Energy Recovery, Distribution, and Storage Subsystems; and Integration Configurations, Equipment Descriptions, Cost Data. (ERA citation 04:053395)

INIS-mf-4791 PC **A02**/MF **A01**
Energistyrelsen, Copenhagen (Denmark).
Energy Research. A Review of the Trade Ministry's Energy Research Program.
Dec 78, 16p
In Danish.
U.S. Sales Only.

A short review is given of the Trade Ministry's program for Danish energy research and development. A short description is given of each research project. (Atomindex citation 10:459643)

NP-23453 PC **A02**/MF **A01**
New Zealand Energy Research and Development Committee, Auckland.
New Zealand Directory of Energy Researchers.
N. Isaacs. 1978, 16p

The directory format is explained and contains a listing of 354 researchers or firms in the following areas: biomass/energy farming; coal extraction including exploration; coal and gas conversion; district heating; electricity generation in fossil fuel plants; environmental controls; geothermal; hydroelectricity; industrial energy use; modelling/economics; nuclear energy; oil and gas exploration; policy; renewables; residential and commercial energy use; solar; storage and transmission systems; transport; and wind energy. (ERA citation 04:026689)

NP-23760 PC **A04**/MF **A01**
Tennessee Univ., Knoxville. Environment Center.
Tennessee Energy Extensive Service Implementation Plan.
N. E. Collins. 12 Dec 77, 68p

Tables and charts are presented which summarize the services to be provided by the Tennessee Energy Extension Service, the customers to be served, financing, evaluation, and the projected time schedules for program implementation. (ERA citation 04:048814)

NP-23859 PC **A10**/MF **A01**
Technische Univ., Hanover (Germany, F.R.).
Interrelations Between Solar Systems and Buildings in the Integration of Solar Collectors on Roofs and Walls.
H. Hullmann. 1977, 213p
In German.Thesis.
U.S. Sales Only.

There are close interrelations between solar systems and buildings if the collectors are installed on the buildings or integrated in these. These interactions are investigated from a functional as well as from a technical point of view. Investigations deal with (1) functioning and design of solar collectors, (2) requirements for the arrangement of solar collectors, (3) constructional physics problems with flat and inclined roofs, (4) constructional physics problems in walls, (5) compatibility problems. There is an appendix discussing problems of the interrelation between solar energy utilization and population density and the relation between the design and functioning of solar houses. (ERA citation 04:051320)

ORNL/Sub-7525/2 PC **A05**/MF **A01**
Aerospace Corp., El Segundo, CA. Information Processing Div.
Solar Total Energy Systems (STES) Simulation Program User's Guide.
B. R. Timmer. 4 Jan 79, 89p ATR-79(7748)-2
Contract W-7405-ENG-26

A computer program which simulates the operations of a STES facility and evaluates its annualized costs and energy displacement is described. The program contains a dynamic model which simulates the interaction of the insolation and electrical and thermal demands on an hourly basis. The program is flexible enough to allow thousands of different configurations to be simulated under a wide variety of conditions. Moreover, with this program, the sizes of the STES components can be adjusted to maximize the return on invested capital or the savings in fossil fuels. The program can also be used to simulate conventional fossil fuel Total Energy (TE) systems and solar thermal energy systems for comparison with STES. The program is written in Fortran for the FTN compiler on The Aerospace Corporation's CDC 7600 computer. It consists of 9 routines and approximately 1300 cards, including comments. A description of the program, its inputs and its outputs are presented. Examples of program input and otput as well as a sample deck structure are provided. A source listing appears in the appendix. (ERA citation 04:051282)

ORNL/Sub-7525/3 PC **A07**/MF **A01**
Aerospace Corp., El Segundo, CA. Electronics and Optics Div.
STES Applications Model (SAM) User's Guide.
A. M. Timmer. 4 Jan 79, 131p ATR-79(7748)-3
Contract W-7405-ENG-26

This document is a user's guide for the STES Applications Model (SAM) which can be used to identify industrial applications which are good candidates for Solar Total Energy Systems (STES). SAM computes and ranks equivalent cost ratio and calculates fuel displacement potential by geographic location (50 states) and by industrial application (140 three digit SIC categories) for seven time periods (from 1985 to 2015 in five year increments). SAM is written in FORTRAN for the FTN compiler on the CDC 7600 computer. (ERA citation 04:049758)

PB80-113566 PC **A09**/MF **A01**
Oklahoma Univ., Norman. Science and Public Policy Program.
Energy from the West: Impact Analysis Report. Volume I: Introduction and Summary.
Final rept. Jul 75-Oct 79,
Irvin L. White, Michael A. Chartock, R. Leon Leonard, Steven C. Ballard, and Martha W. Gilliland. Mar 79, 185p EPA/600/7-79/082A
Contract EPA-68-01-1916
See also Volume 2, PB80-113574.

This document reports the results of impact analyses conducted as a part of a three-year technology assessment of the development of six energy resources (coal, geothermal, natural gas, oil, oil shale and uranium) in eight western states (Arizona, Colorado, Montana, New Mexico, North Dakota, South Dakota, Utah and Wyoming) during the period 1975-2000. Volume I describes the purpose and conduct of the study and summarizes both site-specific and regional impact analysis results.

PB80-113574 PC **A99**/MF **A01**
Oklahoma Univ., Norman. Science and Public Policy Program.
Energy from the West: Impact Analysis Report. Volume II: Site-Specific and Regional Impact Analyses.
Final rept. Jul 75-Oct 79,
Irvin L. White, Michael A. Chartock, R. Leon Leonard, Steven C. Ballard, and Martha W. Gilliland. Mar 79, 991p EPA/600/7-79/082B
Contract EPA-68-01-1916
See also Volume 1, PB80-113566.

This document reports the results of impact analyses conducted as a part of a three-year technology assessment of the development of six energy resources (coal, geothermal, natural gas, oil, oil shale and uranium) in eight western states (Arizona, Colorado, Montana, New Mexico, North Dakota, South Dakota, Utah and Wyoming) during the period 1975-2000. In Volume II, six chapters report on the analysis of the likely impacts of deploying typical energy resource development technologies at sites representative of the kinds of conditions likely to be encountered in the eight-state study area. A seventh chapter describes other local impacts which might occur; and a final chapter reports the results of regional impacts.

RAND/R-2179-DOE PC **A03**/MF **A01**
RAND Corp., Santa Monica, CA.
Projected Nationwide Energy and Capacity Savings from Peak-Load Pricing of Electricity in the Industrial Sector.
J. P. Acton, B. M. Mitchell, and W. G. Manning, Jr. Jun 78, 30p

Contract EX-76-C-01-2337

This report presents estimates of adjustments that U.S. manufacturing industrial consumers of electricity might make if they were to face time-of-day electricity rates. Because there is very little experience in this country with such rates, the estimates given here are based on an analysis of industry-specific responses observed in France and other West European countries where time-of-day pricing has been in effect for two or more decades. The analysis reported here is based in part on that in Rand report R-2106-CERCDC, Electricity Pricing and Load Management: Foreign Experience and California Opportunities. The report concludes with observations about policies that may ease the transition to more complicated pricing schemes. In some circumstances, the introduction of time-of-day pricing may lower the total costs of electricity to industrial customers because their use is predominantly off-peak. In any case, the disruption to industry is not likely to be great because energy is such a small percentage of the total cost of doing business. In industries where energy cost is a large fraction of the cost of doing business, European experience suggests that firms can readily respond to time-of-day pricing. (ERA citation 04:026790)

RAND/R-2253-DOE PC **A06**/MF **A01**
RAND Corp., Santa Monica, CA.
Soviet Energy R and D: Goals, Planning, and Organizations.
R. Campbell. May 78, 109p
Contract EX-76-C-01-2337

The USSR approach to energy R and D planning shows many points of similarity with that used by ERDA. Fairly elaborate modeling studies investigate such questions as the optimal roles and relative importance of different major energy sources, regionalization of energy production and consumption, allocation of each source to the best sectoral use, and the economic gains from introducing various technologies at alternative dates. More-specialized forecasting and modeling at the ministry level provide the basis for choosing the directions for R and D in the energy sector's component branches. Those models are much more varied, but one can find analogs to most of the kinds of studies done in the United States. The quality of this forecasting and modeling is heterogeneous, but it has some characteristic weaknesses in the quality of such framework assumptions as reserve constraints, the availability of certain technologies, and assumptions as to investment and operating costs. It also appears that strategic planning is intermittent and episodic, with consequent delays in adapting policy to changing conditions. The most striking difference in program structure is the much higher ratio of nuclear to fossil-fuel R and D in the United States (1.88) compared with that in the USSR (0.25). In absolute terms, the resource input into the Soviet nuclear programs is apparently somewhat smaller than ours, but Soviet expenditures on fossil-fuel R and D are five or six times larger. (ERA citation 04:026690)

SERI/PR-35-313 PC **A02**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Systems Analysis and Testing (SAT) Program. Progress Report, October 1, 1978--March 31, 1979.
C. J. Bishop. Jul 79, 19p
Contract EG-77-C-01-4042

This document describes SERI activities for the SAT program during 1 October 1978-31 March 1979. These include (1) a reevaluation of thermosiphon hot water systems; (2) a review of existing wind machine performance models; a study of the effects of wind transients, and control system and load management on energy capture; (3) a study of new concepts for solar ponds involving stratified ponds; (4) establishment of the SERI Computational Methods Center; (5) dissemination of F-chart; (6) a review of photovoltaic systems analysis methods; (7) development of a draft SAT Program Plan, SAT Management Plan, and an integrated System Test and Validation Plan; and (8) transfer of technical management of DOE contracts in the SAT program. (ERA citation 04:049707)

SERI/TP-35-300 PC **A02**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Solar Energy Perspectives for Public Power.
N. H. Woodley. Jun 79, 23p CONF-790685-1
Contract EG-77-C-01-4042
The American Public Power Association 1979 national conference, Seattle, WA, USA, 19 Jun 1979.

Perspectives on the utilization of solar energy for electricity production and thermal energy utilization by the public are briefly discussed. Wind energy conversion, biomass conversion, solar thermal, OTEC, photovoltaics, and solar heating and cooling are discussed. (ERA citation 04:050251)

STU-76-5419(Pt.3) PC **A04**/MF **A01**
Styrelsen foer Teknisk Utveckling, Stockholm (Sweden).
Energy Conservation in Iron- and Steel-Industry: A Basis for Planning of R and D.
R. Hardell, J. Fors, and A. Raab. 3 Mar 78, 63p
In Swedish.
U.S. Sales Only.

The steel industry consumes about 20% of the total energy used in Sweden. It is estimated that about 35% of the energy used by the steel industry goes into the metallurgical reactions, which leaves a huge potential for conservation and recovery. The different types of furnaces, their energy consumption and their potential for energy recovery are reviewed. The economics of process heat recovery is briefly discussed. (ERA citation 04:051876)

TID-29379 PC **A11**/MF **A01**
Washington State Univ., Pullman. Environmental Research Center.
Comparison of Coal-Fired Power Systems in Waste Heat Applications in Tacoma, Washington.
J. Robertson. 1979, 235p
Contract EG-77-S-05-5516

An analysis is undertaken of the relative advantages and disadvantages of making use of the waste stream of heat produced as a by-product of electrical power generation in a coal-fired power plant. Efficiency gains in the utilization of waste heat, and environmental impact and economic costs are compared for two types of plants supplying waste heat, and for a conventional energy-supply system that does not make use of waste heat. Small-scale (2.1-MW) Modular Integrated Utility Systems plants, as developed by Oak Ridge National Laboratory, are compared with a large (300-MW) power plant. The basis of comparison of systems is investment in an equivalent 300 MW of installed capacity. The waste-heat supplying systems are sited in a particular urban environment: Tacoma, Washington. The conventional power plant with which they are compared is remote-sited, in eastern Washington. Power plant technologies are described for all systems, as are alternative modes of operation. Waste heat is studied in the supply of two thermal loads: space heat and domestic hot water. The former is supplied by individual natural gas furnaces and the latter is part of the electrical load for the conventional system. Two types of residential end-use demand are connected to the supply modes: garden apartments and individual single dwellings. Waste heat utilization is concluded to be advantageous in efficiency of energy conversion as well as in impacts borne, and is economically competitive in most circumstances. (ERA citation 04:051421)

UT/CES-ES-6 PC **A09**/MF **A01**
Texas Univ. at Austin. Center for Energy Studies.
Energy Requirements for Air Pollution Abatement Equipment in Texas. Environmental Study No. 6.
S. N. Spaw, and J. O. Ledbetter. Aug 78, 199p

An indication of the amount of energy required to provide for a clean environment is needed in order to determine what should be the trade-off between energy conservation and environmental quality. One aspect of the need, the energy requirements necessary to operate the air-pollution-abatement equipment on industrial processes in the state of Texas, is discussed. These energy requirements are compared with the energy requirements necessary to operate the various types of industrial processes considered. It was not possible to consider every type of process in the state, but a wide variety of processes were considered. The classes of industrial processes considered include all of the major users of air-pollution-abatement equipment in the state. Therefore, the energy requirements presented are representative of the total energy necessary to operate the air-pollution-abatement systems. Much of the abatement technology used today in Texas was developed and implemented during the bygone days of cheap natural gas. The development of new technology is needed to conserve energy resources and provide for a clean environment. 71 references. (ERA citation 04:034573)

UT/CES-GS-1 PC **A04**/MF **A01**
Texas Univ. at Austin. Center for Energy Studies.
BOOMP User's Guide.
J. K. Monts. Aug 78, 63p

An attempt has been made to develop a methodology for assessing the socio-economic impacts of various types of energy development. BOOM1 is a computer simulation model that is designed to simulate community-level socio-economic impacts from building a 1500-MW power plant near a hypothetical agricultural community (EAPA 3:1111). Power plants construction attracts in-migrants who in turn create considerable additional demand for private and public facilites, in turn creating a drain on local resources (an increase in property tax rate). BOOMP is an extension of BOOM1 designed to model public sector impacts in a more-detailed fashion. The public sector is disaggregated into the Education, Police Protection, Fire Protection, Water, Sanitary Sewerage, and Residual subsectors. Each of these subsectors is then disaggregated into a Capital Facilities subsector and an Operating Services subsector. The BOOMP conceptualization then identifies the major components of each of these subsectors. The final step in the BOOMP conceptualization is establshing the supply and demand interface with the other sectors of the BOOM model. (ERA citation 04:036606)

UT/CES-PR-4 PC **A07**/MF **A01**
Texas Univ. at Austin. Center for Energy Studies.
Analysis of Transportation Alternative for Meeting Texas' Industrial Demand for Western Coal Through the Year 2000. Public Information Report No. 4.
D. M. White. Mar 78, 136p

An analysis of Texas' industrial energy demands and fuel supplies through the year 2000 is developed for differing assumptions, with particular emphasis on the use and supply of western coal. Existing and potential future transportation facilities for the movement of coal and coal-derived energy between the coal fields of Wyoming and Montana and Texas' demand centers are examined. The technical, economic, environmental, and institutional factors affecting unit trains, slurry pipelines, barges and mine-mouth conversion of coal to electricity and to synthetic gases and liquids are discussed with primary attention directed at unit trains and slurry pipelines. Given the projected demands for western coal, a mathematical network model is utilized to determine the adequacy of existing transporation facilities and the cost of providing additional facilities to meet the projected demands. The results indicate that with moderate investment in railroad maintenance and expansion and continuance of current noncoal rail traffic volumes, adequate rail capacity is available within Texas to handle the projected coal demands through the year 2000. The capacity of the rail network connecting western coal fields with Texas may be a constraint to future coal transportation. The transportation cost using unit trains will be approximately 30 percent greater than if slurry pipelines are utilized although adequate capacity appears to exist to handle the coal demands. From consideration of direct transporation costs and certain subjective criteria, construction of two or three large-capacity slurry pipelines into the Houston area would result in providing the projected coal demands to the state at the minimum total cost. (ERA citation 04:033746)

UT/CES-PS-1 PC **A04**/MF **A01**
Texas Univ. at Austin. Center for Energy Studies.
Explaining Energy Votes in the Ninety-Fourth Congress.
S. C. Lopreato, and F. Smoller. Jun 78, 62p

Currently the United States is undergoing an energy crisis which many observers feel signals

the eclipse of this nation's ability to meet its exponentially increasing demand for energy. The absence of an explicit, comprehensive plan to deal with this problem has caused many Americans concern and has stimulated the curiosity of various students of Congress. Emotions are heightened when an administration's comparatively mild energy plan is introduced in the Congress only to emergy almost a year later a skeleton of its original self, devoid of its most potential features. This study investigates why members of Congress vote the way they do on energy legislation. The roll-call votes in the House of Representatives from the Ninety-fourth Congress are examined. Five factors are described namely: regionalism, state interests, the nature of individual constituencies, party, and ideology; influence voting in the House from these the variables tested in this analysis are drawn. The research design used is then detailed and, finally, results are presented and discussed. (ERA citation 04:036685)

UT/CES-PS-2 PC **A03**/MF **A01**
Texas Univ. at Austin. Center for Energy Studies.
Soviet and East European Energy Crisis: Its Dimensions and Implications for East--West Trade.
E. A. Hewett. Aug 78, 29p

The world energy crisis has placed tremendous pressure on Soviet planners to divert oil destined for Eastern Europe to hard currency markets (or in some cases to charge Eastern Europe hard currency for the oil); and this pressure would have come irrespective of developments in Soviet energy-production costs. The Soviet-East European energy crisis is also political in nature because the increase balance-of-payments problems for Eastern Europe, which will cause austerity measures in the East European countries, measures which the population seems likely to resist. Thus, the Soviet-East European energy crisis is both related and unrelated to the energy crisis we face in the United States. The purpose of this paper is to project to 1980 the aggregate energy balance in Eastern Europe and the USSR, and to explore the implications of that projection for East--West trade. The year 1980 is not very far away; it would be prefereble if the projection could go farther. But the technique used here is simple extrapolation with some educated guesses concerning growth rates. Such techniques tend to work quite well for the near future; over the longer term the only hope is to actually model the processes involved and their interconnections. 18 references and footnotes. (ERA citation 04:036614)

UT/CES-PS-3 PC **A03**/MF **A01**
Texas Univ. at Austin. Center for Energy Studies.
Energy Projections: Oil, Natural Gas, and Coal in the USSR and Eastern Europe.
G. W. Hoffman. Aug 78, 42p

The large spread tabulated for Soviet oil, gas, and coal production is indicative of the problem of preparing reliable energy-balance forecasts. Predictions of growth rates for total energy production and consumption of a short-term nature are notoriously unreliable. It is clear that energy projections for 1985 and later years offer greater flexibility to cover envisioned shortages through conservation and the use of various energy resources which at the present time are in the experimental stage or initial research, such as nuclear power, geothermal power, solar energy, nuclear fusion, and various substitutes. The need for an ever-increasing supply of oil, gas, and coal produced in the Soviet Union and the countries of Eastern Europe has focused on the problem of geography and geology and its broader impact on locational and environmental problems of energy resources. More than 97% of the energy resources of the CMEA countries are located in the Soviet Union: 77% of the bituminous reserves, 98% of natural gas, and 97% of crude oil. An appendix includes: selected bibliography on Soviet and East European energy resources and Soviet Trade in oil and gas on the world market. Also, there are 76 references to the main text. (ERA citation 04:036695)

UT/CES-PS-5 PC **A04**/MF **A01**
Texas Univ. at Austin. Center for Energy Studies.
U.S. Oil Geography in 1990: Scenarios and Implications for Economic Policy.
E. V. Niemeyer, and J. W. McKie. Oct 78, 66p

The geography of crude oil movements, of refining location, and of shipment of refined products to markets in the United States has been changing at an accelerating rate since the beginning of the 1970s. Several possible scenarios of future development are analyzed and factors that are likely to be most important in determining the economic geography of the domestic oil industry are identified using an analytical model. Findings related to the 1990 base case are presented and policy issues are summarized. (ERA citation 04:032200)

10B. Power Sources

AD-A075 955/5 PC **A02**/MF **A01**
Army Electronics Research and Development Command Fort Monmouth Nj Electronics Technology/Devices Lab
Regenerative Burner System for Thermoelectric Power Sources.
Technical rept.,
G. Guazzoni , J. Angello , and A. Herchakowski.
Jul 79, 8p Rept no. DELET-TR-79-16

A thermoelectric power source is being developed to provide a multifuel, silent, maintenance free tactical power generator for forward area and unattended-operation applications. An experimental study of a regenerative burner system for the 500-Watt Thermoelectric Power Source has resulted in significant reduction in fuel consumption and infrared signature of the power source. (Author)

AD-A076 133/8 PC **A05**/MF **A01**
Coast Guard Research and Development Center Groton Ct
Coast Guard Evaluation of a Wave Activated Turbine Generator Buoy.
Final rept. Jan 73-Sep 77,
D. J. Hilliker , W. E. Colburn , and J. W. Cutler, Jr. Sep 77, 77p CGR/DC-22/77, USCG-D-84-77

Wave activated turbine generator buoys were tested at Chesapeake Light (14 miles off Cape Henry, Virginia) and in Boston Harbor. The buoys were instrumented to record cumulative power generated and later modified to record sea state as well as other variables pertinent to turbine operation. Results are presented as long-term power generation, power generation as a function of wave height and period, and transfer functions from spectral analysis of data. (Author)

AD-A076 209/6 PC **A04**/MF **A01**
Naval Ocean Systems Center San Diego Ca
Power Electronics Technology Applications for Future SSBNs - FY 78. Switching Mode Power Supply Designs are Compatible with Sensitive SSBN Circuits.
Final rept.,
E. Kamm. 1 Aug 79, 66p Rept no. NOSC/TR-443

The impact of switching-regulator noise on sensitive communication circuits is investigated. State-of-the-art switching-mode power supplies are shown to be compatible with sensitive receiver circuits including low-frequency receivers. Recent advances in component design and circuit design techniques that curtail or contain electromagnetic interference (EMI) in switching-mode converters are discussed. The frequency spectrums of the powerline-conducted EMI are analyzed for both ac and dc input designs. By using an optimally designed input filter, the emission caused by the switching action is shown to be less than expected new CE-03 limits for MIL-STD-461A. A major breakthrough in reducing EMI is a recently developed topology for switching-mode power supplies. Compared to dissipative power supplies, low voltage switching-mode power supplies occupy less volume, weigh less, cost less, and use less energy. (Author)

AD-A076 315/1 PC **A07**/MF **A01**
Advisory Group for Aerospace Research and Development Neuilly-Sur-Seine (France)
Fluid Dynamic Aspects of Wind Energy Conversion,
O. deVries. Jul 79, 150p Rept no. AGARD-AG-243

A review is made of the fluid dynamic aspects of wind energy conversion. A short survey of the total framework of wind energy conversion is given to bring the fluid dynamics aspect in its proper dimensions. Next, the several wind concentrator concepts are discussed, while the main body of the report is formed by a discussion of the theory of wind-driven turbines, including both the horizontal-axis and the vertical-axis turbines. The report concludes with a survey of inhomogeneous flow and turbulence effects, turbine control and wake interference effects. (Author)

AED-Conf-78-155-010 PC **A02**/MF **A01**
GHH Gutehoffnungshuette Sterkrade A.G., Oberhausen (Germany, F.R.).
Electric Power Generation and LNG Evaporation with the Aid of Gas Turbines within a Closed-Cycle Process.
D. Weber. 1978, 19p CONF-7804102-6
In German.Systems exhibition energy within the context of the Hannover fair, Hannover, F.R. Germany, 19 Apr 1978.
U.S. Sales Only.

LNG, after being pumped to customary pipeline pressure, has a high working potential which can be technically utilized. Thus, in a modern large-size terminal, a power potential in the order of magnitude of several hundred MW is available. In the course of rising power prices the question becomes important if this potential continues to be wasted or if conversion to electric power is economical. In the proposed process the working fluid of a gas turbine plant with a closed circuit is cooled to -140 exp 0 C with LNG before entering the compressor and heated to +720 exp 0 C before entering the turbine by means of external heat gained by burning natural gas. With a 1 million m exp 3 /h throughput of LNG in its normal state, 237 MW of electric power can be generated with 53% efficiency with this simple circuit, which can be further developed. In a combination of closed gas turbine and diesel generator, almost 289 MW of electric power can be produced per 1 million m exp 3 /h LNG with an efficiency of 60%. (ERA citation 04:026194)

AED-CONF-77-565-007 PC **A03**/MF **A01**
STEAG Anlagentechnik, Essen (Germany, F.R.).
State of the ART of Combined Gas/Steam Turbine Power Plants with Upstream Coal Pressure Gasification Plant by the STEAG-Lurgi System.
H. Meyer-Kahrweg. 1977, 26p CONF-771261-10
In German.Conference on coal gasification and hydrogenation, Essen, F.R. Germany, 7 Dec 1977.
U.S. Sales Only.

This report describes the 170 MW coal pressure gasification power plant at Zuenen, progress in coal pressure gasification, and the development of the KDV-400 gas, steam turbine, and boiler plant. (ERA citation 04:053133)

ALO-5302-T1 PC **A02**/MF **A01**
Pennsylvania State Univ., University Park. Materials Research Labs.
Black Germanium Selective Absorber Surfaces. Semi-Annual Progress Report, September 1, 1978-March 1, 1979.
R. F. Messier, and K. Vedam. 23 Apr 79, 10p
Contract EM-78-C-04-5302

It was shown that by controlling the sputtering preparation conditions of noncrystalline Ge films the surface microstructure can be drastically altered by simply etching in 30% H sub 2 O sub 2 . The resulting surface has a total reflectance of less than 3% in the solar spectrum. This flat-black surface appearance is shown to be due to a dense array of aligned, needle-like protrusions which have an extremely high aspect ratio and both a cross-sectional area and a separation between needles on the order of the wavelength of solar radiation. A systematic series of thin films were prepared by rf-sputtering with rf-power and Ar gas pressure as the primary preparation parameters and characterizing the various films. (ERA citation 04:052964)

ALO-5308-T2 PC **A02**/MF **A01**
Wisconsin Univ.-Madison.
Polymer Surface Coatings for Downconversion of UV Radiation and Inhibition of Photodegradation.
W. M. Yen, and H. Yu. 1978, 12p

Contract EM-78-C-04-5308

The objective is to develop and evaluate the surface coatings on polymeric substrates which will downconvert the uv component of solar radiation into the visible or IR region and will simultaneously inhibit photodegradation of the plastic glazings. Cerous ion (Ce III) and other trivalent lanthanide ions are known to downconvert uv radiation into visible or IR owing to their low-lying electronically excited states. Thus plastic glazing substrates overcoated with these ions in sufficient concentration are expected to be resistant to the photodegradative effect of the uv component of the solar spectrum. Cerous (III) polymethacrylate (CPMA), prepared by saponifying a commercial polymethyl methacrylate (Plexiglas) and subsequently neutralizing with cerous nitrate, were cast into film from its ethyl acetate solution. CPMA films were subjected to an intense uv radiation in order to accelerate the solarization, and they were found to be substantially less susceptible to uv induced degradation than the control which was the film cast from polymethacrylic acid (PMA). A set of CPMA coated Plexiglas films were then tested by the same method and the films with coating thickness of 5 mu were inhibitory toward the uv degradation although the surface density of cerous ion was not uniform. A solar simulator has been assembled and calibrated. It has begun to test a series of CPMA coated Plexiglas films. (ERA citation 04:049766)

ANL/IVTAN-JT-2 PC **A10**/MF **A01**
Argonne National Lab., IL.
US/USSR Cooperative Program in Open-Cycle MHD Electrical Power Gneration. Joint Test Report No. 2: Tests in the U-25B Facility; MHD Generator Test No. 3.
K. E. Tempelmeyer, and Y. N. Sokolov. Apr 79, 220p
Contract W-31-109-ENG-38

The third joint test with a Soviet U-25B MHD generator and a US superconducting magnet system (SCMS) was conducted in the Soviet U-25B Facility. The primary objectives of the 3rd test were: (1) to operate the facility and MHD channel over a wider range of test parameters, and (2) to study the performance of all components and systems of the flow train at increased mass flow rates of combustion products (up to 4 kg/s), at high magnetic-field induction (up to 5 T), and high values of the electrical field in the MHD generator. The third test has demonstrated that all components and systems of the U-25B facility performed reliably. The electric power generated by the MHD generaor reached a maximum of 575 kW during this test. The MHD generator was operated under electrical loading conditions for 9 hours, and the combustor for a total of approximately 14 hours. Very high Hall fields (2.1 kV/m) were produced in the MHD channel, with a total Hall voltage of 4.24 kV. A detailed description is given of (1) performance of all components and systems of the U-25B facility, (2) analysis of the thermal, gasdynamic, and electrical characteristics of the MHD generator, (3) results of plasma diagnostic studies, (4) studies of vibrational characteristics of the flow train, (5) fluctuation of electrodynamic and gasdynamic parameters, (6) interaction of the MHD generator with the superconducting magnet, and (7) an operational problem, which terminated the test. (ERA citation 04:055138)

ANL/MHD-78-11 PC **A05**/MF **A01**
Argonne National Lab., IL.
Technical Support for Open-Cycle MHD Program. Progress Report, April-June 1978.
D. H. Bomkamp. Jul 79, 76p
Contract W-31-109-ENG-38

The support program for open-cycle MHD at Argonne National Laboratory is developing the analytical tools needed to investigate the performance of the major components in the combined cycle MHD/steam power system. The analytical effort is centered on the primary components of the system that are unique to MHD and also on the integration of these analytical representations into a model of the entire power producing system. The project activities currently include modeling of the combustor, MHD channel, slag separator and the high temperature air heater. In addition, these models are combined into a complete system model which is presently capable of carrying out optimizations of the entire system on either thermodynamic efficiency or cost of electrical power. Also, in support of other aspects of the open-cycle program, test plans are developed and facility and program reviews are provided upon request to support the needs and requirements of the DOE/MHD Division. (ERA citation 04:055140)

ANL/MHD-79-1 PC **A10**/MF **A01**
Argonne National Lab., IL.
Experimental Two-Phase Liquid-Metal Magnetohydrodynamic Generator Program. Final Report, October 1977-September 1978.
M. Petrick, G. Fabris, E. S. Pierson, A. K. Fischer, and C. E. Johnson. Apr 79, 211p
Contract W-31-109-ENG-38

The experimental results presented satisfy one major goal in demonstrating the technical feasibility of two-phase LMMHD (liquid-metal MHD), i.e., operating an MHD generator at power densities equal to or above that anticipated for practical power systems. Power densities of up to 32 MWe/m exp 3 and efficiencies higher than 0.6 at high void fractions were attained for a small 20-kWe generator. Slip ratio data, and more-extensive pressure distribution and voltage profile data are also given. Barium has been identified as an attractive additive for the generation of foams with NaK, and bismuth is a back-up for barium. A guiding hypothesis for understanding the phenomena contributing to foamability in liquid metal systems has been developed, and basic data on surface tension obtained. A computer code has been developed that will calculate the electrical end loss for any insulating vane geometry and magnetic flux density distribution, a significant accomplishment. Initial studies with this code have shown that generator efficiencies in excess of 0.8 are attainable. Initial measurements of local flow parameters in a NaK-nitrogen two-phase liquid-metal MHD generator, using hot-film and resistivity probes, are reported. Although the results are preliminary, there is evidence that large electromagnetic force densities have a significant effect on the sixze and distribution of the gas bubbles or voids. All results are very encouraging for the development of large high-efficiency LMMHD generators. (ERA citation 04:055142)

ANL/OTEC-BCM-002 PC **A15**/MF **A01**
Argonne National Lab., IL.
Proceedings of the Ocean Thermal Energy Conversion (OTEC) Biofouling, Corrosion, and Materials Workshop, January 8-10, 1979, Rosslyn, Virginia.
1979, 349p
Contract W-31-109-ENG-38

The 23 papers presented are entered in the data base separately. Round table sessions on measurement of R/sub f/ and analysis of heat transfer data, biology of fouling, corrosion and the application of materials, and fouling and countermeasures are included. (ERA citation 04:054395)

ANL/SPG-16 PC **A02**/MF **A01**
Argonne National Lab., IL.
Centralizing or Decentralizing: The Impact of Decentralized Electric Generation.
J. G. Asbury, and S. B. Webb. Mar 79, 19p
Contract W-31-109-ENG-38

If rising fuel prices or public policy make decentralized electric generation economical for the residential, commercial, and manufacturing sectors, the economies of scale in these sectors will increase. With current technology, some energy users, such as most single-family dwellings, will find it prohibitively expensive to install and use total-energy systems. They will continue to purchase electricity from a central utility, even though a decline in the utility's customers may increase its cost and prices. Other energy users, such as midsized manufacturing enterprises, might find it economical to set up their own generating facilities but would still find themselves operating at higher energy costs per unit of output than larger enterprises with more efficient systems. In both cases, decentralized electric generation would work against the smaller energy users, putting them at a disadvantage relative to the larger, more concentrated users. The objective of this paper is not to oppose alternative energy technologies in general or decentralized electric generation in particular. Such technology should be used if it becomes economical. It is false, however, to argue that decentralized generation is desirable because it will decentralize decision-making in the economy. Like carpooling, public transportation, and other measures to reduce energy cost, cogeneration and total-energy systems that make decentralized electric generation economical will also require increased coordination of economic decision-making. (ERA citation 04:055109)

BMFT-FB-T-78-33 PC **A08**/MF **A01**
Messerschmitt-Boelkow-Blohm G.m.b.H. Munich (Germany, F.R.).
Development of a Prototype of a 10 KW/sub El/-Solar Power Station.
D. Wolf, H. Bihlmayr, J. Carl, V. Merges, and P. Prikryl. Sep 77, 167p
In German.
U.S. Sales Only.

In the Federal Republic of Germany the described plant was commissioned as the first fully integrated solar power plant. Beyond this in the Federal Republic of Germany three other small plants for the generation of electricity from solar energy are being developed. The aim had been the development of a small solar power plant for generation of electricity in a autonomous operation using technologies as simple as possible and components from series production. The development of the small solar power plant advanced in the two planned phases: (1) design, installation and commissioning of the plant and of the supporting systems; (2) performance of a test program. During acceptance tests for the customer the specified maximum net power output of 10 kW/sub el/ at a cooling water temperature of 35 exp 0 C, the observance of the voltage- and frequency tolerances of the generated current, and the partial load operation were successfully demonstrated. Further tests under real operation conditions in long term operation mode will be performed n Madras, India. (ERA citation 04:044557)

BNL-50951 PC **A03**/MF **A01**
Brookhaven National Lab., Upton, NY.
Fuel Cells: Applied Research Fuel Cell Materials and Electrocatalysis. Annual Report, January 1-December 31, 1977.
S. Srinivasan, H. S. Isaacs, W. E. O'Grady, P. G. Russell, and H. Olender. Dec 78, 40p
Contract EY-76-C-02-0016

Separate abstracts were prepared for the four sections included. (ERA citation 04:053377)

BNL-51038 PC **A03**/MF **A01**
Brookhaven National Lab., Upton, NY.
Fuel Cell Applied Research: Electrocatalysis and Materials. Semi-Annual Report, January 1-June 30, 1978.
S. Srinivasan, H. S. Isaacs, W. E. O'Grady, H. Olender, and L. J. Olmer. Apr 79, 50p
Contract EY-76-C-02-0016

Separate abstracts were prepared for the two sections included. Also included is a synopsis of the workshop on the electrocatalysis of fuel cell reactions held at Brookhaven National Laboratory on May 15 and 16, 1978. (ERA citation 04:053381)

CONF-7810130-3 PC **A02**/MF **A01**
Institute of Gas Technology, Chicago, IL.
Effects of Sulfur-Containing Gases on Molten Carbonate Fuel Cell Behavior.
T. D. Claar, R. A. Donado, and L. G. Marianowski. 1978, 16p
Contract EM-78-C-03-1735
The molten carbonate fuel cell workshop, Oak Ridge, TN, USA, 31 Oct 1978.

The effects of sulfur on performance and endurance of molten carbonate fuel cells were investigated using gases containing 10 to 50 ppM H sub 2 S in fuel or SO sub 2 in oxidant. Performance penalties were quite severe with standard components and losses were predominatly at the anode. Sulfur introduced into the cathode as SO sub 2 was absorbed by the carbonate electrolyte, most likely as sulfate, transported through the tile, and regenerated at the anode as H sub 2 S and COS. Thermodynamic analyses and pot equilibration tests under highly utilized low-Btu fuel containing 50 ppM H

sub 2 S indicate only low levels of alkali sulfide or sulfate are expected on the anode side of the cell. Data have been obtained on the effects of sulfur species on anode materials stability, electrolyte chemistry, component corrosion, and LiAlO sub 2 support particles. Promising cell performance results have been obtained with cobalt-based anodes. (ERA citation 04:050262)

CONF-781191- PC **A23**/MF **A01**
OAO Corp., Beltsville, MD.
Proceedings of the US DOE Photovoltaics Technology Development and Applications Program Review.
1978, 543p
Contract NAS-7-100-689604
DOE photovoltaics technology development and applications program review conference, Arlington, VA, USA, 7 Nov 1978.

The proceedings include summaries of thirty-eight presentations under the following sections: overview and project status reports; standards performance criteria; cost/economics; concentrator and flat panel technology alternative for 50 cents/watt; balance of system technology; and experience gained from the design and operation of photovoltaic systems. (ERA citation 04:054295)

CONF-790539-1 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Condensation and Evaporation Heat Transfer with Low-Boiling Temperature Fluids.
R. W. Murphy, and H. W. Hoffman. 1979, 4p
Contract W-7405-ENG-26
Southeastern seminar on thermal sciences (SESTS), Boca Raton, FL, USA, 10 May 1979.

Heat transfer research at ORNL related to OTEC and geothermal energy conversion power cycles are reviewed. (ERA citation 04:049663)

CONF-790631-10 PC **A02**/MF **A01**
Argonne National Lab., IL.
Performance Tests of the 1MWt Shell-and-Tube Heat Exchangers for OTEC.
A. Thomas, J. J. Lorenz, D. L. Hillis, D. T. Yung, and N. P. Sather. 1979, 11p
Contract W-31-109-ENG-38
OTEC conference, Washington, DC, USA, 19 Jun 1979, Portions of document are illegible.

Final test results are reported for the five 1 MWt shell-and-tube heat exchangers tested at Argonne National Laboratory. These five heat exchangers are the Union Carbide flooded-bundle evaporator, the Union Carbide sprayed-bundle evaporator, the Union Carbide enhanced-tube condenser, the Carnegie-Mellon vertical fluted-tube evaporator, and the Carnegie-Mellon vertical fluted-tube condenser. Performance parameters measured include the overall heat transfer coefficient (U sub 0), the water-side pressure drop, and the vapor quality. Also measured were operational characteristics of the heat exchangers such as repeatability of results and the dependence of U sub 0 on heat duty, ammonia flow rate, and subcooling. Individual water-side and ammonia-side coefficients were deduced using the Wilson Plot method. (ERA citation 04:052882)

CONF-790631-11 PC **A02**/MF **A01**
Argonne National Lab., IL.
OTEC Physical and Climatic Environmental Impacts.
J. D. Ditmars, and R. A. Paddock. 1979, 10p
Contract W-31-109-ENG-38
OTEC conference, Washington, DC, USA, 19 Jun 1979.

Assessment of Ocean Thermal Energy Conversion (OTEC) environmental impacts and resource utilization requires an understanding of the physical processes underlying the interactions between an OTEC plant or plants and the ocean. An overview of the US Department of Energy program for the development and application of analyses and models for the prediction of the physical aspects of OTEC impacts is presented. Predictive tools are necessary to address problems at different site areas, scales of OTEC deployment, and time horizons. The effects of intake/discharge designs and of ambient ocean conditions on recirculation and near-field effluent plume behavior have been investigated by means of physical models. Further study of the intake flow fields may be necessary to make estimates of intake impingement and entrainment effects. Mathematical analysis of intermediate-field mixing of plant effluents has shown that effluent plumes may have vertical dimensions on the order of meters and lateral dimensions on the order of kilometers. Models of oceanic regional and island coastal circulation are required to investigate far-field effects on the scale of tens of kilometers. Basin-wide resource renewal and physical environmental effects are being studied by means of a numerical model of the Gulf of Mexico with detailed vertical resolution. Concerns regarding climatic impacts presently are focused on atmospheric CO sub 2 loading and modification of air–sea heat exchange processes due to OTEC operation. (ERA citation 04:052883)

CONF-790640-3 PC **A02**/MF **A01**
Argonne National Lab., IL.
Condensation and Deposition of Seed in the MHD Bottoming Plant.
K. H. Im, J. Patten, T. R. Johnson, and K. Tempelmeyer. 1979, 8p
Contract W-31-109-ENG-38
18. symposium on engineering aspects of magnetohydrodynamics, Butte, MT, USA, 18 Jun 1979.

The computer models of slag vapor nucleation and particle deposition have been extended to predict the growth and deposition of seed particles in the steam and air heater sections of the MHD bottoming plant. The model represents a hot combustion gas stream, which contains vaporized seed and entrained slag particles of a selected initial size distribution, flowing through a bank of cooled tubes. The energy balance includes convective and radiant heat transfer to the cool surfaces. The material balance for the condensible species considers convective mass transport of seed vapor to cool surfaces, and the deposition of particles on cooled surfaces by thermophoresis. The analyses provide the bases for design trade-off studies of steam tube size and spacing, gas velocity, and system configuration to optimize the effectiveness and cost of the steam plant. In the absence of entrained slag particles, sample calculations indicated that, as the gas is cooled in passing through a tube bank, the bulk of the seed vapor condenses in the gas stream to form particles with diameters in the range of 0.02 to 0.2 mu m. In the presence of the submicron slag particles formed upstream in the MHD diffuser, the largest fraction of the seed vapor condenses on the existing entrained particles, causing them to grow to a size in the range of approximately one micron. In both cases, these particles are deposited on heat exchange surfaces throughout the heat recovery system and a large fraction is present in the cool combustion gas entering the exhaust gas clean-up system. (ERA citation 04:053372)

CONF-790640-4 PC **A02**/MF **A01**
Argonne National Lab., IL.
High-Temperature Liquid--Metal MHD Generator Experiments.
P. F. Dunn, E. S. Pierson, and J. D. Staffon. 1979, 8p
Contract W-31-109-ENG-38
18. symposium on engineering aspects of magnetohydrodynamics, Butte, MT, USA, 18 Jun 1979.

Detailed data were obtained for the world's first high-temperature two-phase liquid--metal MHD generator under open-circuit conditions. Both single-phase (sodium) and two-phase (sodium and nitrogen) flows were used in the temperture range of approx. 490 to approx. 740 exp 0 K. The data presented includes pressures, voltages, and slip ratios (ratio of gas velocity to liquid velocity). The two-phase pressure--gradient data were predicted well by a simplified two-phase MHD correlation that includes the effect of a pure-liquid shunt layer between the electrodes. The slip ratio is shown to decrease with increasing temperature, implying higher generator and system efficiencies; this anticipated result was a prime reason for performing these experiments. (ERA citation 04:053366)

CONF-790640-5 PC **A02**/MF **A01**
Argonne National Lab., IL.
Study of the U-25B MHD Generator System in Strong Electric and Magnetic Fields.
A. D. Iserov, V. I. Maksimenko, and G. I. Maslennikov. 1979, 15p
Contract W-31-109-ENG-38
18. symposium on engineering aspects of magnetohydrodynamics, Butte, MT, USA, 18 Jun 1979.

The third and fourth tests of the U-25B facility have demonstrated that the MHD flow train has operated for over 50 h with little difficulty. Review of the data reveals no significant problems associated with vibration, stress, or fluctuation of the electrical and gasdynamic parameters of the system components. In Test 3, the MHD generator produced a maximum power of 575 kW, a maximum Hall voltage of 4240 V, and a maximum Hall field of 2100 V/m. Inverter loading characteristics indicated that the upstream portion of the channel operated at low conductivity compared to the two downstream sections. During Test 4, at a lower mass flow rate but with cesium seed and oxygen enrichment to 60%, a power level of about 400 kW was generated. Because of inadvertent water and air leakage into the combustion chamber, however, combustion temperatures were lower in Test 4 that anticipated. These factors had a detrimental effect on the generator performance. Analysis of the data obtained from Tests 3 and Test 4 illustrates that in order to increase the power of the U-25B channel, a number of steps should be taken to increase the effective plasma conductivity and channel mass flow. For example, increasing the mass flow rate to 5 kg/s and achieving a K/sub sigma/ of 0.7 to 0.8, a channel inlet temperature about 2950 K may produce an electrical power output up to 1.3 MW. Steps are being taken to increase the preheat temperature in the facility, as well as to eliminate all water and air leakage into the combustor and decrease other thermal losses in the combustor nozzle and generator. (ERA citation 04:055139)

CONF-790803-50 PC **A02**/MF **A01**
Argonne National Lab., IL.
Turbomachinery Options for an Underground Pumped Hydroelectric Storage Plant.
C. A. Blomquist, S. W. Tam, and A. A. Frigo. 1979, 11p
Contract W-31-109-ENG-38
14. intersociety energy conversion conference, Boston, MA, USA, 5 Aug 1979.

Various turbomachinery options for underground pumped hydroelectric storage (UPHS) plants are reviewed. Current technology indicates that the maximum head for single-stage, reversible, Francis-type pump turbines is 625 m; for separate, single-stage, Francis-type turbines and multistage pumps, 672 m; for tandem units consisting of separate multijet impulse turbines and multistage pumps, 1440 m; and for multistage, reversible, ungated Francis-type pump turbines, 1290 m. Engineering design studies conducted for Argonne National Laboratory indicated that heads for the single-stage reversible units could be extended to 1000 m, developing 500-MW output per unit. The studies also indicated that two-stage, reversible, Francis-type pump turbines with adjustable wicket gates could be developed for power outputs up to 500 MW at operating heads as high as 1500 m. Results of these studies, including performance and design data, are presented. Using the cost of a single-stage, reversible, Francis-type pump turbine as 1, the approximate cost of other turbomachines is: 1.55 for a single-gated, two-stage, reversible pump turbine; 1.67 for a double-gated, two-stage, reversible pump turbine; 1.9 for an ungated, multistage, reversible pump turbine; and 3.3 for a tandem unit (Pelton and pump). (ERA citation 04:054281)

CONF-790808-14 PC **A02**/MF **A01**
Oak Ridge Y-12 Plant, TN.
Heat Transfer and Pressure Drop in Gas-Cooled Fluidized-Bed Combustors for Gas Turbine Systems: Analysis and Application to Design.
R. L. Graves. 1979, 21p
Contract W-7405-ENG-26
18. ASME national heat transfer conference, San Diego, CA, USA, Aug 1979.

Information is presented concerning the effects of design parameters for fluidized bed air heaters for

gas turbines on the cost-related characteristics of the inbed heat exchanger. An analysis of the pressure drop/heat transfer relations is described and the results and implications for design are presented. According to these results, the cost of the heater for a pressurized, closed-cycle turbine system is likely to exceed that of an open-cycle system in which the compressor discharge pressure is lower. Higher air pressure and higher allowable pressure drop are shown to be effective in lowering the operating temperature of the heat exchanger tubes. (ERA citation 04:048528)

CONF-790808-16 PC **A04**/MF **A01**
Oak Ridge National Lab., TN.
Waste Heat Rejection from Geothermal Power Stations.
R. C. Robertson. 1979, 70p
Contract W-7405-ENG-26
18. ASME national heat transfer conference, San Diego, CA, USA, Aug 1979.

Waste heat rejection systems for geothermal power stations have a significantly greater influence on plant operating performances and costs than do corresponding systems in fossil- and nuclear-fueled stations. With thermal efficiencies of only about 10%, geothermal power cycles can reject four times as much heat per kilowatt of output. Geothermal sites in the United States tend to be in water-short areas that could require use of more expensive wet/dry or dry-type cooling towers. With relatively low-temperature heat sources, the cycle economics are more sensitive to diurnal and seasonal variations in sink temperatures. Factors such as the necessity for hydrogen sulfide scrubbers in off-gas systems or the need to treat cooling tower blowdown before reinjection can add to the cost and complexity of goethermal waste heat rejection systems. Working fluids most commonly considered for geothermal cycles are water, ammonia, Freon-22, isobutane, and isopentane. Both low-level and barometric-leg direct-contact condensers are used, and reinforced concrete has been proposed for condenser vessels. Multipass surface condensers also have wide application. Corrosion problems at some locations have led to increased interest in titanium tubing. Studies at ORNL indicate that fluted vertical tubes can enhance condensing film coefficients by factors of 4 to 7. (ERA citation 04:053081)

COO-3443-1 PC **A05**/MF **A01**
Burns and Roe, Inc., Oradell, NJ.
Assessment of Turbine Generator Technology for District Heating Applications.
I. Oliker. Sep 78, 99p
Contract EN-78-C-02-4602

Steam turbines for cogeneration plants may carry a combination of industrial, space heating, cooling and domestic hot water loads. These loads are hourly, weekly, and seasonally irregular and require turbines of special design to meet the load duration curve, while generating electric power. Design features and performance characteristics of large cogeneration turbine units for combined electric generation and district heat supply are presented. Different modes of operation of the cogeneration turbine under variable load conditions are discussed in conjunction with a heat load duration curve for urban heat supply. The performance of the 250 MW district heating turbine as applied to meet the heat load duration curve for Minneapolis--St. Paul area is analyzed, and associated fuel savings are estimated. (ERA citation 04:026203)

COO-4049-10 PC **A02**/MF **A01**
Management and Technical Services Co., Bruceton, PA.
Operation and Maintenance of DOE/PERC Two-Stage MHD Pressurized Coal Combustor. Quarterly Activity Report, July 15, 1978--September 30, 1978.
30 Oct 78, 10p
Contract EY-76-C-02-4049

No abstract available.

COO-4049-2 PC **A02**/MF **A01**
Management and Technical Services Co., Bruceton, PA.
Operation and Maintenance of ERDA/PERC Two-Stage MHD Pressurized Coal Combustor. Quarterly Activity Report, 1 October 1976--31 December 1976.
6 Jan 77, 11p
Contract EY-76-C-02-4049

No abstract available.

COO-4049-3 PC **A02**/MF **A01**
Management and Technical Services Co., Bruceton, PA.
Operation and Maintenance of ERDA/PERC Two-Stage MHD Pressurized Coal Combustor. Quarterly Activity Report, 1 January 1977--31 March 1977.
27 Apr 77, 19p
Contract EY-76-C-02-4049

No abstract available.

COO-4049-4 PC **A02**/MF **A01**
Management and Technical Services Co., Bruceton, PA.
Operation and Maintenance of ERDA/PERC Two-Stage MHD Pressurized Coal Combustor. Quarterly Activity Report, 1 April 1977--30 June 1977.
1977, 16p
Contract EY-76-C-02-4049

No abstract available.

COO-4049-5 PC **A02**/MF **A01**
Management and Technical Services Co., Bruceton, PA.
Operation and Maintenance of ERDA/PERC Two-Stage MHD Pressurized Coal Combustor. Quarterly Activity Report, July 1, 1977--September 30, 1977.
20 Oct 77, 17p
Contract EY-76-C-02-4049

The installation and performance testing of a 1000 lb/hr coal dryer are described in detail. Run No. 9 was then run in the combustor. Various problems encountered are discussed, including the buildup of slag on the cyclone floor, so that the slag tap hole had to be cleared with a paper. Post-test examination is described and it was decided to replace the water-cooled cyclone bottom with a refractory bottom. This was later modified by adding water cooling coils to control the temperature more precisely. Difficulties in attaining the desired particle size of pulverized coal are discussed. (ERA citation 04:048791)

COO-4049-6 PC **A02**/MF **A01**
Management and Technical Services Co., Bruceton, PA.
Operation and Maintenance of ERDA/PERC Two-Stage MHD Pressurized Coal Combustor. Quarterly Activity Report, October 1--December 31, 1977.
27 Jan 78, 15p
Contract EY-76-C-02-4049

Runs 12, 13, 14, and 15 in the combustor are described. Various difficulties (coal blockage, slag solidification over the tap hole, human damage due to excessive temperature, etc.) are described. The unit was modified so that it could be started with fuel oil or propane and then coal or coal/fuel oil fed. (ERA citation 04:048795)

COO-4049-7 PC **A02**/MF **A01**
Management and Technical Services Co., Bruceton, PA.
Operation and Maintenance of DOE/PERC 100 HP Coal Slurry Facility. Quarterly Activity Report, January 1, 1978--March 31, 1978.
26 Apr 78, 14p
Contract EY-76-C-02-4049

Various problems encountered in Runs 15 and 16 are described. The modifications made as a result of these problems are discussed. (ERA citation 04:048796)

COO-4049-8 PC **A02**/MF **A01**
Management and Technical Services Co., Bruceton, PA.
Operation and Maintenance of DO/PERC Two-Stage MHD Pressurized Coal Combustor. Quarterly Activity Report, April 1, 1978--July 14, 1978.
7 Aug 78, 15p
Contract EY-76-C-02-4049

Run No. 17 is discussed in some detail. The test was stopped due to overheating of the cyclone floor (stopped before much damage occurred). Various problems are discussed and the modifications made in response to them are described. Deposits were cleaned from parts of the system and new instrumentation was installed. (ERA citation 04:048797)

COO-4051-29 PC **A04**/MF **A01**
Brown Univ., Providence, RI. Div. of Engineering.
Sourcebook on the Production of Electricity from Geothermal Energy. Chapter 2 (Draft). Resource Characteristics: Reservoirs, Wellheads and Delivery Systems. Part 3. Analysis of the Flow in the Reservoir: Well System.
D. J. Ryley. Jun 78, 72p
Contract EY-76-S-02-4051

This report is a preliminary version of material assembled for insertion in the Sourcebook on the Production of Electricity from Geothermal Energy currently being composed under ERDA (now DOE). An attempt has been made to develop the theory of the geothermal well in an ordered stepwise manner beginning from the three basic continuities and introducing each new idea systematically. A formal textbook approach is used. (ERA citation 04:026147)

COO-4051-36 PC **A03**/MF **A01**
Brown Univ., Providence, RI. Dept. of Engineering.
Effect of Non Condensable Gases on the Performance of Geothermal Steam Power Systems.
H. E. Khalifa, and E. Michaelides. Nov 78, 39p
Contract EY-76-S-02-4051

The influencce of dissolved carbon dioxide on the thermodynamic performance of geothermal steam systems is analyzed. The system is divided into its main component: the flash tank, the turbine, the condenser and the gas extraction system, and the effect of non condensables is studied for each. The effect of the noncondensable gas on the output of the whole system is deduced from its effect on the individual components. The analysis of actual systems is preceded by an analysis of an ideal system. The optimum condenser pressure for actual systems is obtained for different gas extraction system efficiencies. Economic considerations, however, are only qualitatively addressed. (ERA citation 04:053082)

COO-4094-42 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Physical and Electrical Degradation of Photovoltaic Modules after Exposure in Terrestrial Environments.
S. E. Forman, and M. P. Themelis. 1979, 5p
CONF-790803-40
Contract EY-76-C-02-4094
14. intersociety energy conversion conference, Boston, MA, USA, 5 Aug 1979.

Between March 1977 and March 1979, MIT/Lincoln Laboratory, in conjunction with the US Department of Energy, placed 75 kW of photovoltaic modules at various experimental test sites in the United States. The largest of these include a 25 kW array field in Mead, Nebraska, used to power corn irrigation and crop drying equipment; a ground level 25 kW array field in Lexington, used as a residential system test bed; a 15 kW rooftop test bed in Lexington, used to evaluate components of photovoltaic systems prior to field installation. To date only 44 modules (amounting to 600 watts) out of 6,000 have experienced electrical failures. This report summarizes the performance of the photovoltaic modules at the Mead test site and describes the physical and electrical changes which have occurred due to weathering and soil accumulation since start-up in July 1977. Where relevant, comparisons will be made with modules at the other test sites. (ERA citation 04:054320)

COO-4094-44 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.

Flywheel Energy Storage Interface Unit for Photovoltaic Applications.
A. R. Millner, and R. D. Hay. 1979, 5p CONF-790803-42
Contract EY-76-C-02-4094
14. intersociety energy conversion conference, Boston, MA, USA, 5 Aug 1979.

A flywheel energy storage and conversion system has been designed and a prototype is now being built at Massachusetts Institute of Technology/Lincoln Laboratory for the US Department of Energy. It is intended to serve as an interface between a solar photovoltaic array and an ac load, providing output waveform regulation as well as energy storage. Important features include magnetic bearings, an ironless armature motor generator and a low-cost flywheel rotor. The system design and prototype characteristics are described, a preliminary economic analysis is given. (ERA citation 04:053254)

COO-4094-48 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Flywheel Energy Storage and Conversion System for Photovoltaic Applications.
A. R. Millner. 1979, 15p CONF-790515-4
Contract EY-76-C-02-4094
International assembly on energy storage, Dubrovnik, Yugoslavia, 27 May 1979.

A flywheel energy storage and conversion system has been designed and is now being built at Massachusetts Institute of Technology/Lincoln Laboratory for the United States Department of Energy. It is intended to serve as an interface between a solar photovoltaic array and an ac load, providing output waveform regulation as well as energy storage. Important characteristics include magnetic bearings, an ironless armature motor-generator, and a low-cost flywheel rotor. The system design tradeoffs are described, and a preliminary economic analysis is presented. (ERA citation 04:055023)

COO-4094-55 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Solar Photovoltaic Project: Materials, Processes, and Testing Activities. Quarterly Report, 1 January-31 March 1979.
S. E. Forman, and M. P. Themelis. 30 Jun 79, 50p
Contract EY-76-C-02-4094

The Department of Energy has set a 20-year-lifetime goal for terrestrial photovoltaic modules. Massachusetts Institute of Technology's Lincoln Laboratory, in its capacity as a Photovoltaic Field Tests and Applications Center, has established throughout the United States various experimental test sites which range in size from 0.1 to 25 kW of peak power. These sites include modules from several manufacturers and serve as test beds for photovoltaic system components. The activities of the Materials, Processes, and Testing Laboratory of the Solar Photovoltaic Project during a three-month (1/1/79-3/31/79) period are summarized. During this period, an inspection trip was made to the Mead, Nebraska, test site. The modules were tested in the field to determine the extent of physical and electrical degradation which had taken place since previous inspections. In addition, several modules were removed from the site for more detailed laboratory examination. The results of both the field testing and laboratory analyses are reported. (ERA citation 04:054324)

COO-4531-3 PC **A06**/MF **A01**
Illinois Inst. of Tech., Chicago. Dept. of Mechanical Engineering.
Effect of Alternate Cooling Systems and Beneficial Use of Waste Heat on Power Plant Performance.
D. K. Rao, and R. W. Porter. Nov 78, 123p
Contract EC-77-S-02-4531

The performance and cost of alternate closed-cycle cooling systems for steam--electric power plants are discussed. Included are cooling ponds, spray canals and mechanical- and natural-draft wet cooling towers. Besides equipment, operational and maintenance costs, loss of generating capacity is determined on a seasonal basis in order to determine life-cycle costs relative to once-through cooling. In addition, two beneficial uses of waste heat are similarly analyzed: once-through discharge of condenser coolant into a municipal water supply and interaction of a conventional cooling system with a wastewater treatment plant. Both typical nuclear- and fossil-fueled power plants are considered throughout. Meteorological and system parameters were taken for the Chicago area as an example. Plant heat rates, availability and unit costs were selected from the literature. A new unified analysis of closed-cycle-cooling system performance is developed in order to facilitate computation of loss of generating capacity. The order of cooling systems in terms of increasing cost is: once-through, pond, natural-draft wet tower, spray canal and mechanical-draft wet tower. Alternatively, once-through discharge into a municipal water supply would save 1 to 2% of power-plant fuel and 14 to 22% of residential water-heater energy. Or, the interactive wastewater plant would save 2 to 15% of treatment costs, favoring larger facilities. (ERA citation 04:053132)

COO-4651-11 PC **A08**/MF **A01**
Montana State Univ., Bozeman.
Review and Assessments of Potential Environmental, Health and Safety Impacts of MHD Technology. Final Draft.
1978, 160p
Contract EP-78-C-02-4651

The purpose of this document is to develop an environmental, health and safety (EH and S) assessment and begin a site - specific assessment of these and socio - economic impacts for the magnetohydrodynamics program of the United States Department of Energy. This assessment includes detailed scientific and technical information on the specific EH and S issues mentioned in the MHD Environmental Development Plan. A review of current literature on impact-related subjects is also included. This document addresses the coal-fired, open-cycle MHD technology and reviews and assesses potential EH and S impacts resulting from operation of commercially-installed technology. (ERA citation 04:053361)

COO-4878-6 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Advanced Solar Receiver Development.
P. O. Jarvinen. 1979, 5p CONF-790541-49
Contract ET-78-S-02-4878
International Solar Energy Society meeting, Atlanta, GA, USA, 28 May 1979.

Ceramic receivers for advanced solar Brayton and advanced solar Stirling thermal power systems are considered which utilize impingement jet cooled silicon carbide ceramic dome heat exchanger modules in conjunction with a cavity receiver geometry to heat a pressurized gaseous heat transfer fluid to temperatures in the range from 1800 to 2400 exp 0 F. Conceptual designs of single and multiple-dome ceramic cavity receivers are presented and analyzed and a combined analytical and experimental program to develop a high temperature seal for the ceramic dome module is reported. (ERA citation 04:052806)

COO-4878-7 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Conceptual Design of a Solar-Heated-Air Receiver Coupled to a Brayton or Stirling Engine.
N. I. Hamilton, and P. O. Jarvinen. 1979, 5p CONF-790541-51
Contract ET-78-S-02-4878
International Solar Energy Society meeting, Atlanta, GA, USA, 28 May 1979.

A particularly interesting possibility for a parabolic dish/cavity receiver combination is the coupling of the cavity to a Stirling or Brayton engine. The design of the receiver is a pacing item in the development of the approach and requires knowledge of the flux distribution within the receiver. Thus several cavity configurations need to be considered to ascertain the trade-offs between cavity geometry and flux distribution. Simple analytical tools developed are applied to the analysis and design of a dome-capped cylindrical receiver that has desirable characteristics for transferring heat to a Dish/Brayton or Dish/Stirling system. (ERA citation 04:052807)

COO-5092/3 PC **A10**/MF **A01**
General Electric Co., Washington, DC. Tempo Center for Advanced Studies.
Study of Integration Issues to Realize OTEC Market Potential. First Quarterly Report.
Dec 78, 211p
Contract EW-78-C-02-5092

The specific objective of this study is to examine the commercialization of OTEC technology in the electric utility industry in the Gulf region of the United States. To accomplish this, the project staff is identifying the major issues that will arise in the integration of OTEC units into the power delivery systems in the Gulf Region. Among these issues are problems that must be resolved and barriers to be overcome. These are being identified and alternative approaches to resolving or overcoming them will be explored. Their relative importance in the integration will be assessed as well. The alternative approaches to resolving problems and overcoming barriers will be evaluated to determine their relative effectiveness, and the problems and barriers will be conceptually resolved. This evaluation will permit the recommendation of preferred approaches to integration and the preferred approaches will be assembled into a structured strategy for OTEC commercialization. A list of 134 references relevant to OTEC electric power plant integration issues is included. (ERA citation 04:052884)

DOE/CS/34267-1 PC **A06**/MF **A01**
Battelle Columbus Labs., OH.
Photovoltaic Concentrator Application Experiment, Phase I: a 150 KW Photovoltaic Concentrator Power System for Load-Center Applications with Feedback into the Utility Grid. Final Report, June 1, 1978--March 31, 1979.
G. T. Noel, G. Alexander, L. H. Stember, G. H. Stickford, and H. E. Smail. Apr 79, 123p
Contract ET-78-C-04-4267

A 150-kW-peak concentrator-type photovoltaic power system to supply a multiple building load application in the Columbus, Ohio area was designed and analyzed by a Battelle-led team. The system will operate in parallel with the utility grid (which provides backup power) to supply either or both of two service/commercial buildings and will feed surplus power into the utility grid. The array consists of fifteen 10-kW carousel-mounted subarrays which are two-axis tracking. The subarrays each consist of 40 passively cooled concentrating modules which incorporate a primary parabolic trough reflector and a secondary compound-elliptic concentrator to achieve a geometric concentration ratio of approx. 26. The power conditioning subsystem is microprocessor controlled, with maximum-power-point tracking and automatic control capabilities. The system performance analysis indicates that the system will supply approximately 147,000 kWh/year to the primary load and an additional 55,000 kWh/year to the utility grid, in the single-load operational mode. The system design and the daily and seasonal match of system output with the load are described in detail. Plans are also discussed for installation and for operational evaluations of performance, economics, and institutional issues. (ERA citation 04:051266)

DOE/EDP-0045 PC **A09**/MF **A01**
Department of Energy, Washington, DC.
Environmental Development Plan: Magnetohydrodynamics.
May 79, 199p

The updated Environmental Development Plan (EDP) for DOE's MHD Program is presented. A brief summary of the environmental concerns identified in the original MHD EDP is given. MHD technology and DOE's MHD program are described and environmental concerns are identified. The environmental research that should be conducted to ensure that the environmental concerns associated with MHD are addressed and resolved are tabulated. An environmental strategy to resolve the numerous environmental concerns is developed. (ERA citation 04:053362)

DOE/EIA-0033/1 PC **A11**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.

Steam--Electric Plant Construction Cost and Annual Production Expenses 1975. Twenty-Eighth Annual Supplement.
Jan 78, 246p CRN-780106-00011

The 1975 supplement contains data for 621 conventional fossil-fueled steam--electric plants in the contiguous US, four in Hawaii, one in Alaska, and four in Puerto Rico. In addition, data on 38 nuclear-fueled steam--electric plants are reported in this supplement. Fourteen new fossil-fueled plants are reported for the first time. One fossil-fueled plant and one nuclear plant reported in prior supplements were omitted from this supplement. The 626 plants located in the US accounted for 99% of the capacity and 97% of the generation of utility-owned, fossil-fueled steam--electric plants in the US. At mid-1977, 252 new fossil-fueled units 300 MW and larger and totaling 145,002 MW were in preliminary test, under construction, or scheduled to start construction, for service between 1977 and 1986. Projected nuclear capacity as of the first half of 1977, for service during the period 1977 through 1986, was 130,532 MW in 121 units. Projected fossil-steam and nuclear-generating capacity additions for the 1976 through 1985 period were revised downward from the previous projection covering the 1975 through 1984 period. Recession-related financing problems and reduction in load growth during 1975 and 1976 forced a revision downward in projected capacity additions for the period 1976 through 1985. These same problems were the main reason for just a minimal increase in the amount of new capacity projections for the 1977 through 1986 period. Currently installed fossil-fueled and nuclear-fueled steam--electric capacity is 393,169 MW. The annual retirements of steam--electric generating capacity for the years 1951 to 1975 are shown. (ERA citation 04:053332)

DOE/EIA-0033/2 PC **A12**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Steam-Electric Plant Construction Cost and Annual Production Expenses 1976. Twenty-Ninth Annual Supplement.
Aug 78, 251p

Since the initial publication of this series in 1938, the total installed fossil-fueled steam-electric generation capacity has increased from 26,000 MW to 368,696 MW and the annual net generation from 68.4 billion to 1.53 trillion kWh. The plant investment costs and the 1976 annual production expenses of 679 steam-electric plants in the US and Puerto Rico are presented in some detail. Forty-three of these are nuclear-fueled plants. (ERA citation 04:055099)

DOE/EIA-0052 PC **A02**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
EIA Issues Power Production, Generating Capacity Data for 1972 to 1977.
Jun 78, 25p

Statistics on trends in electric power production, generation capacity, and consumption of fossil fuels over a six-year period, 1972 through 1977, are presented. (ERA citation 04:055113)

DOE/ER-0032 PC **A05**/MF **A01**
Harza Engineering Co., Chicago, IL.
Utility Interface Requirements for a Solar Power System.
P. J. Donalek, and J. L. Whysong. Sep 78, 76p
Contract W-31-109-ENG-38

This study specifies that the southern tier of the US (south of the 36th parallel) should be examined to see what problems might develop with the installation of a Satellite Power System (SPS) in the year 2000. One or more 5-GW SPS units could be installed in the utility systems of the southern states in the year 2000. The 345- and 500-kV transmission systems that will probably exist at that time could be readily extended to accommodate the SPS units. The operation of the units will present the utilities with new and difficult problems in system stability and frequency control. The problems will arise because a somewhat variable 5-GW output will be produced by a generator having no mechanical inertia. The unavoidable time lag in controlling the position of the energy beam at the receiving station may have a very critical effect on the stability of the utility systems. The maintenance problems associated with the energy-receiving device, a continuous structure covering more than 40 mi exp 2 , must be given careful consideration. Repair of lightning damage while maintaining SPS operation may be the most critical requirement. Acquisition and preparation of the 90 mi exp 2 land required for the receiving antenna (rectenna) will create many new and difficult environmental problems. (ERA citation 04:052804)

DOE/ET/23003-1 PC **A02**/MF **A01**
Westinghouse Electric Corp., Pittsburgh, PA. Research and Development Center.
Emerging Material Systems for Solar Cell Applications.
W. J. Biter, and J. R. Szedon. 8 Aug 79, 23p
Contract AC04-79ET23003

Primary effort to date involves modifications and additions to the vacuum system in order to produce films of InP by the plasma-induced deposition process. (ERA citation 04:054325)

DOE/ET/23103-5 PC **A02**/MF **A01**
Delaware Univ., Newark.
Carrier Transport Through Heterojunction Solar Cells.
K. W. Boeer. 1979, 7p CONF-790457-8
Contract EX-76-C-23-1030
1979 photovaltaic solar energy conference, West Berlin, F.R. Germany, 23 Apr 1979.

The carrier transport through heterojunctions is influenced by the interconnection between the bands of the two semiconductors, by space charge effects near this interconnection and by interface recombination. The estimation of the discontinuity of the conduction bands using the difference in electron affinities is insufficient. A modified model takes the chemical and crystallographical nature of the interconnection into consideration. The analysis includes the discussion of a space charge double layer caused by charged dangling bonds along the dislocation network and its compensation via charged defects. These cause a certain donor-acceptor pair formation which act as efficient recombination centers and cause a reduction of the open circuit voltage. The space charge double layer and interface recombination may cause a non-monotonic band profile near the interface. The specifics of such band profile for CdS/Cu sub 2 S and Cd/sub x/Zn/sub 1-x/S/Cu sub 2 S heterojunctions are evaluated quantitatively and agree within the experimental error with the observation, that, with decreasing lattice mismatch, the open circuit voltage increases, while the short circuit current decreases. (ERA citation 04:054326)

DOE/ET/23103-6 PC **A02**/MF **A01**
Delaware Univ., Newark.
Photovoltaic Effect, Its Present Understanding and Remaining Mysteries.
K. W. Boeer. 1979, 5p CONF-790541-44
Contract EX-76-C-23-1030
International Solar Energy Society meeting, Atlanta, GA, USA, 28 May 1979.

The present phenomenological understanding of the photovoltaic effect and solar cells is discussed. Unexpiained questions and problems with the effects of various device parameters on the current-voltage characteristics are discussed, and the need for more sophisticated theoretical analyses of photovoltaic cells is stressed. 26 references. (ERA citation 04:054327)

DOE/ET/33008-1 PC **A08**/MF **A01**
Minnesota Mining and Mfg. Co., St. Paul. Electrical Products Group.
SIG Galileo Final Converter. Technical Summary Report.
J. D. Hinderman. May 79, 175p
Contract EY-76-C-02-2331

The report summarizes significant events, activities and achievements on the SIG/Galileo Converter Program at 3M Company during the period June 1, 1978 through May 15, 1979. A stop work order was received from DOE on January 29, 1979 and all subsequent work and close out activities targeted for completion by May 15, 1979. Section A describes, in detail, the component configurations developed and proposed for the SN-1 converter. This converter was the Flight Design with the possible exception of N-leg improvements and a cold frame-housing interface processing change. Included at the end of the converter description is the status of the design at the time of the stop work order. In Section B, the activities performed to accomplish the design goals are described as they occurred. Section C lists all pertinent documentation which was developed and issued relating to the design of the converter. This includes drawings, specifications, procedures and analysis. Operating requirements for the SN-1 converter are given. (ERA citation 04:052724)

DOE/JPL-1060-17 PC **A06**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Effects of Regional Insolation Differences Upon Advanced Solar Thermal Electric Power Plant Performance and Energy Costs.
A. F. Latta, J. M. Bowyer, T. Fujita, and P. H. Richter. 15 Mar 79, 117p
Contract EX-77-A-29-1060

This study determines the performance and cost of four 10 MWe advanced solar thermal electric power plants sited in various regions of the continental United States. Each region has different insolation characteristics which result in varying collector field areas, plant performance, capital costs and energy costs. In the context of advanced technology, the solar plants are conceptualized to begin commercial operation in the year 2000. The paraboloidal dish, central receiver, cylindrical parabolic trough, and compound parabolic concentrators comprise the advanced collector concepts studied. All concepts exhibit their best performance when sited in regional areas such as the sunbelt where the annual insolation is high. The regional variation in solar plant performance has been assessed in relation to the expected rise in the future cost of residential and commercial electricity supplied by conventional utility power systems in the same regions. A discussion of the regional insolation data base, a description of the solar systems' performance and costs, and a presentation of a range for the forecast cost of conventional electricity by region and nationally over the next several decades are given. (ERA citation 04:054384)

DOE/JPL-1060-9 PC **A10**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Thermal Power Systems: Small Power Systems Applications Project. Volume II. Detailed Report. Annual Technical Report, Fiscal Year 1978.
15 Jan 79, 212p
Contract EX-76-A-29-1060

Small Power Systems Applications activities for FY 1978 are reported. Studies were conducted to address current small power system technology as applied to power plants up to 10 MWe in size. Markets for small power systems were characterized and cost goals were established for the project. Candidate power plant system design concepts were selected for evaluation and preliminary performance and cost assessments were made. Economic studies were conducted at JPL and under contract to Burns and McDonnell. Breakeven capital costs were determined for leading contenders among the candidate systems. An applications study was made of the potential use of small power systems in providing part of the demand for pumping power by the extensive aqueduct system of California, estimated to be 1000 MWe by 1985. Criteria and methodologies were developed for application to the ranking of candidate power plant system design concepts. Experimental power plants concepts of 1 MWe rating were studied by three contractors as a Phase I effort leading toward the definition of a power plant configuration for subsequent detail design, construction, testing and evaluation as Engineering Experiment No. 1 (EE No. 1). Site selection criteria and ground rules for the solicitation of EE No. 1 site participation proposals by DOE were developed. (ERA citation 04:054382)

DOE/JPL/954328-10 PC **A03**/MF **A01**
Battelle Columbus Labs., OH.
Development of Accelerated Test Design for Service-Life Prediction of Solar Array at Mesa, Nebraska. Quarterly Report.
G. B. Gaines, R. E. Thomas, G. T. Noel, T. S. Shilliday, and V. E. Wood. 3 Nov 78, 28p

Contract NAS-7-100-954328

As a significant beginning in applying accelerated tests to solar arrays for life-prediction purposes, this study is directed toward (a) developing a plan for predicting the service life of a specific solar array in a specific geographic site - viz., the 25-KW flat-plate array installed near Mead, Nebraska, and (b) developing technical information from laboratory and field measurements for designing an accelerated test that can be carried out in 2 years and have predictive validity for a service life as long as 20 years. Status of the program is described. (ERA citation 04:052775)

DOE/JPL/954334-8 PC **A05**/MF **A01**
Union Carbide Corp., Tarrytown, NY.
Feasibility of Low-Cost, High-Volume Production of Silane and Pyrolysis of Silane to Semiconductor-Grade Silicon. Low Cost Silicon Solar Array Project. Quarterly Progress Report for July--September 1978.
W. C. Breneman, E. G. Farrier, and H. Morihara. 1978, 84p
Contract NAS-7-100-954334

The project is divided into four tasks: silane production, silicon production, process design, and fluid-bed pyrolysis R and D. The purpose of the silane production task is to determine the feasibility and practicality of high-volume, low-cost production of silane (SiH_4) as an intermediate for obtaining solar-grade silicon metal. The process is based on the synthesis of SiH sub 4 by the catalytic disproportionation of chlorosilanes resulting from the reaction of hydrogen, metallurgical silicon, and silicon tetrachloride. The goal is to demonstrate the feasibility of a silane production cost of under $4.00/kg at a production rate of 1000 MT/year. The objective of the silicon production task is to establish the feasibility and cost of manufacturing semi-conductor grade polycrystalline silicon through the pyrolysis of silane (SiH_4). The silane-to-silicon conversion is to be investigated in a fluid bed reactor and in a free-space reactor. The process design task is to provide JPL with engineering and economic parameters for an experimental unit sized for 25 metric tons of silicon per year and a product-cost estimate for silicon produced on a scale of 1000 metric tons per year. The purpose of fluid-bed pyrolysis task is to explore the feasibility of using electrical capacitive heating to control the fluidized silicon-bed temperature during the heterogeneous decomposition of silane and to further explore the behavior of a fluid bed. These basic studies will form part of the information necessary to assess technical feasibility of the fluid-bed pyrolysis of silane. Status of these tasks are reported. (ERA citation 04:052776)

DOE/JPL/954728-2 PC **A02**/MF **A01**
Endurex Corp., Dallas, TX.
Ion Plating of Solar Cell Arrays. Final Report, March 12, 1977-December 31, 1978.
B. M. Finegan. 1978, 23p
Contract NAS-7-100-95-4728

Endurex has been engaged in a feasibility study to determine practicality of utilizing Endurex ion plated films to serve as anti-reflective and/or protective encapsulants for solar cell arrays. It has been demonstrated that thin films of oxide materials between 1000 and 2000 A thick will protect a photovoltaic device from degradation in salt spray. Additionally, transmissively data accumulated on Endurex coatings show that the anti-reflective (AR) properties of this film are equal to any achieved by more widely used processes. The Endurex ion plating process is capable of being scaled up to meet 1986 throughput goals at a cost which is in line with 1986 cost goals. An additional benefit that may be realized by the utilization of ion plating is that it is an effluent free process utilizing no wet chemistry. (ERA citation 04:054330)

DOE/JPL/955006-1 PC **A03**/MF **A01**
Texas Instruments, Inc., Dallas.
LSA Silicon Material Task Closed-Cycle Process Development. Quarterly Report No. 1, August--September 1978.
R. A. Roques, G. F. Wakefield, J. M. Blocher, Jr., and M. F. Browning. Oct 78, 26p
Contract NAS-7-100-955006

This program is Phase I of an effort to achieve production of low-cost solar grade polysilicon from metallurgical grade silicon in a closed cycle process. The impure silicon will be converted to trichlorosilane by reaction with by-product silicon tetrachloride, and the trichlorosilane thermally decomposed in a rotary drum reactor. The technical restrictions applied to development of the program approach were based on minimizing new technology requirements by evolving existing technology to reduce the timing, risk, and cost of achieving production capability. The deficiencies in the established Siemens polysilicon process were identified and systematically eliminated to achieve a simple, continuous, easily scalable, low-cost process. The process is closed cycle with high reactant concentration for material, equipment and energy efficiency. The initial effort to demonstrate the feasibility of the closed cycle process was begun with the design of the two major untested equipments: the silicon tetrachloride reactant-product converter and the rotary drum reactor (RDR) for deposition of silicon from trichlorosilane. The design criteria of the initial laboratory equipment included consideration of the reaction chemistry, thermodynamics, and other technical factors. Preliminary design of the laboratory equipment was completed and major parts for fabrication were placed on order. A preliminary solar grade polysilicon cost estimate of $6.91/kg supports the potential of this approach to achieve the cost goal. Program plan and evaluation criteria were submitted for JPL approval. A program milestone chart and baseline cost estimate were made and plans for th next quarter firmed up. (ERA citation 04:052777)

DOE/JPL/955089-10 PC **A06**/MF **A01**
Optical Coating Lab., Inc., City of Industry, CA. Photoelectronics Div.
Silicon Solar Cell Process Development, Fabrication and Analysis. First Quarterly Report, June 15--September 30, 1978.
H. I. Yoo, P. A. Iles, and D. P. Tanner. 1978, 120p
Contract NAS-7-100-955089

Solar cells were fabricated from unconventional silicon sheets (Wacker Silso wafers and EFG ribbon, RF furnace grown), and the performances were characterized with an emphasis on statistical evaluation. A number of solar cell fabrication processes were used, and conversion efficiency was measured under AMO condition at 25 exp 0 C. Silso solar cells using standard processing showed an average efficiency of about 9.6%. Solar cells with back surface field (BSF) process showed about the same efficiency as the cells from standard process. Solar cells from grain boundary passivation process did not show any improvements in solar cell performance. These efficiency values are about 2% lower than those of the single-crystalline control solar cells of about the same resistivity. Solar cells (2 x 2 cm) from corners and edges of the original Silso wafer (10 x 10 cm) showed considerably lower efficiency than those of the cells from the middle part, mainly due to the difference in grain size, and this result agrees well with the result of the minority-carrier diffusion length and spectral response measurements. EFG solar cells (area about 506 cm exp 2) were fabricated using standard and BSF processes. Average efficiency of the standard and BSF solar cells was around 7.8% and 8.5%, respectively. This is about 1% lower efficiency than that of the Silso solar cells, due to lower curve-fill factor and open-circuit voltage, and was suspected to be due to shunting caused by silicon-carbided particles from die material. Minority-carrier diffusion length stayed about the same in both sheets, showing about 40 to 60 mu m range. (ERA citation 04:052778)

DOE/JPL/955201-1 PC **A02**/MF **A01**
Aerospace Corp., El Segundo, CA. Ivan A. Getting Labs.
Low Cost Solar Array Project: Composition Measurements by Analytical Photon Catalysis. First Quarterly Report, November 1--December 31, 1978.
D. G. Sutton, L. Galvan, J. Melzer, and R. F Heidner, III. 1978, 25p
Contract NAS-7-100-955201

The object of this research is to assess the applicability of the photon catalysis technique for effecting composition analysis of silicon samples. In particular, the technique is to be evaluated as a detector for the impurities Al, Cr, Fe, Mn, Ti, V, Mo and Zr. During the first reporting period Al, Cr, Fe and Mn were detected with the photon catalysis method. The best fluorescence lines to monitor were established, and initial sensitivities to each to these elements were determined by atomic absorption calibration. In the course of these tests, vapor pressure curves for these four pure substances have also been mapped. (ERA citation 04:052779)

DOE/NASA/CR-150794 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Huntsville, AL. George C. Marshall Space Flight Center.
Indoor Test and Long-Term Weathering Effects on the Thermal Performance of the Solar Energy System (Liquid) Solar Collector.
May 79, 42p
Contracts EG-77-C-01-4050, EX-76-A-29-1037

The procedures used and the results obtained during the evaluation test program on the Solar Energy Systems, Inc., (Liquid) Solar Collector are presented. The narrow flat-plate collector with reflective concentrating mirrors uses water as the working fluid. The double-covered collector weighs 137 pounds and has overall dimensions of about 35" x 77" x 6.75". The test program was conducted to obtain the following information: thermal performance data under simulated conditions, structural behavior under static load, and the effects of long-term exposure to natural weathering. These tests were conducted using the MSFC Solar Test Facility and Solar Simulator. (ERA citation 04:052971)

DOE/NASA/0002-79/1 PC **A14**/MF **A01**
Boeing Engineering and Construction Co., Seattle, WA.
MOD-2 Failure Mode and Effects Analysis.
R. Lynette, and R. Poore. Jul 79, 325p NASA-CR-159632
Contract EX-76-A-29-1022

The failure mode and effects analyses (FMEA) were performed during preliminary and detail design in order to identify all MOD-2 failure modes and to ensure that the resultant effects are: (1) acceptable from a safety standpoint and (2) fail safe or, if not fail safe, represent least cost solutions (i.e., result in the lowest cost of electricity). The FMEA's were completed by the cognizant designers and reviewed by system engineers and a reliability specialist. In general, fail safe design is employed wherever cost effective and a safe life design is employed for single thread structural items such as the rotor. The failure severity code used in the analysis is described. (ERA citation 04:053124)

DOE/NASA/1004-79/16 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Use of Wind Data with an Operational Wind Turbine in a Research and Development Environment.
H. E. Neustadter. 1979, 14p NASA-TM-73832, CONF-790665-1
Contract EX-76-A-29-1004
American Meterological Society, Portland, OR, USA, 19 Jun 1979.

The need to measure and collect wind data persists well after a wind turbine is initially made operational. This is particularly the case in an R and D program such as the Wind Energy Project being conducted by Lewis Research Center for the Department of Energy. The status is presented of the use of wind information in four areas, namely: Operational Control, Design Verification, Power Performance Analysis, and Lifetime Estimation. Attention is also given to some of the identified, but as yet unmet, wind informational needs and the steps planned to meet these needs. (ERA citation 04:049844)

DOE/NASA/1028-78/20 PC **A02**/MF **A01**
Department of Energy, Washington, DC. Office of Energy Technology.
Microprocessor Control of a Wind Turbine Generator.
A. J. Gnecco, and G. T. Whitehead. 1978, 20p NASA-TM-79021

Contract EX-76-A-29-1028
Conference on industrial applications of microporcessors, Philadelphia, PA, USA, 20 Mar 1978.

A microprocessor based system used to control the unattended operation of a wind turbine generator is described. The turbine and its microcomputer system are fully described with special emphasis on the wide variety of tasks performed by the microprocessor for the safe and efficient operation of the turbine. The flexibility, cost and reliability of the microprocessor were major factors in its selection. (ERA citation 04:026171)

DOE/NASA/2674-79/6 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Performance Characteristics of a Slagging Gasifier for MHD Combustor Systems.
K. O. Smith. Jun 79, 50p
Contract EF-77-A-01-2674

The performance of a two-stage, coal combustor concept for MHD systems was investigated analytically. The two-stage MHD combustor comprises an entrained flow, slagging gasifier as the first stage and a gas phase reactor as the second stage. The first stage was modeled by assuming instantaneous coal devolatilization and volatiles combustion and char gasification by CO sub 2 and H sub 2 O in plug flow. Heterogeneous surface reaction rates were determined from experimental data in the literature. Gasifier heat loss was treated parametrically. Slag effects were not considered. The second-stage combustor was modeled assuming adiabatic instantaneous gas phase reactions. Of primary interest was the dependence of char gasification efficiency on first-stage particle residence time. The influence of first-stage stoichiometry, heat loss, coal moisture, coal size distribution, and degree of coal devolatilization on gasifier performance and second-stage exhaust temperature was determined. Performance predictions indicate that particle residence times on the order of 500 msec would be required to achieve gasification efficiencies in the range of 90 to 95%. The use of a finer coal size distribution significantly reduces the required gasifier residence time for acceptable levels of fuel-use efficiency. Residence time requirements are also decreased by increased levels of coal devolatilization. Combustor design efforts should maximize devolatilization by minimizing mixing times associated with coal injection. (ERA citation 04:054029)

DOE/SF/10505-1 PC **A03**/MF **A01**
Bureau of Reclamation, Boulder City, NV.
Solar Thermal Electric Plants in Hydroelectric Grid. Technical Progress Report, February 9, 1979--May 9, 1979.
17 Jul 79, 26p
Contract AI03-79SF10505

The Solar Thermal Electric Plant in Hydroelectric Grid study is a joint effort between the Bureau of Reclamation's (BUREC), Lower Colorado Region and the Engineering and Research Office (E and R) Center in Denver. During the course of the study the technical and economic assessment of operating a solar power plant in conjunction with the BUREC hydroelectric system in the Southwest will be investigated. The study will examine the hydrologic impacts of integrating a solar power plant into the hydroelectric system. Investigations into the size, cost, and operation of advanced solar systems will also be included in the study. In addition, energy costs, the potential penetration of solar plants into the system, and selection of candidate sites for building the system will be studied. Site selection studies are nearing completion. All factors have been selected that will be used in the candidate site selection. The factor maps have been compiled and will be drafted to finished copies. The final grading procedures to select candidate sites are presently being completed. The hydrologic model of the river/reservoir system is being developed using Streamflow Synthesis and Reservoir Regulation (SSARR). The initial performance and cost data have been reviewed for three solar power systems. The systems under review are the designs of General Electric (GE), Atomics International (AI), and Martin Marietta (MMC). Two of the systems, the GE and MMC systems are under consideration at this time. Future efforts will include the completion of the site selection, running an operational study of the river/reservoir system with flows modified to reflect the impact of a solar power plant, and to perform solar power plant sensitivity studies. (ERA citation 04:051269)

DOE/TIC-10165 PC **A02**/MF **A01**
Department of Energy, Oak Ridge, TN. Technical Information Center.
Computer Modelling of Amorphous Materials for Photovoltaic Conversion. Second Quarterly Progress Report.
16 Apr 79, 11p
Contract W-31-109-ENG-38

The results of exploraton of various aspects of electron localization in models of amorphous silicon are reported. These results have been obtained by computations on only one or two examples, but nevertheless are useful in providing a concrete picture of a-Si that has some unexpected features. Among these are fluctuations in charge neutrality as large as 0.5e, which have implications for the electrical conductivity of a-Si as well as its vibration frequencies and infrared absorption coefficient. Also, when defects in a-Si are introduced, it is found that the localization parameter reaches remarkably high values for a few states at the Fermi level. (ERA citation 04:054331)

DOE/TIC-10451 PC **A10**/MF **A01**
Federal Energy Administration, Washington, DC.
DOD Photovoltaic Energy Conversions Systems: Market Inventory and Analysis. Volume I.
Jun 77, 212p

This report provides realistic estimates of the potential DOD market for photovoltaics for a range of scenarios examined. An assessment has been made of potential actions which the DOD can take to accelerate industry and market development of photovoltaics. The principal focus of the study is on delineating near term DOD markets. Analyses indicate that a large DOD and private sector market for photovoltaic energy systems should develop as unit array costs decline from the current price of $15.50 per peak watt (Wp) to $2/Wp or less. Such a decline would be expected to occur if mass production techniques replaced the current handcrafted production processes. These markets could sustain rapid industry development into the early 1980's. At this point, major new intermediate term markets must be developed to support continued industry growth. Eventually prices may decline to the point where photovoltaic energy systems are cost effective relative to commercial electric power. The advantages to DOD offered by photovoltaics are discussed. In addition to potential cost and fuel savings, photovoltaic energy systems would provide the DOD a highly reliable, silent power source allowing virtually unattended operation in most areas of the world. Near term benefits to the DOD include cost and logistics savings at remote sites, in portable equipment and offshore applications. The national benefits from accelerated commercialization of photovoltaics are considered. Over the longer term, photovoltaic energy systems will offer the nation a cost competitive source of commercial electric power or provide a user-owned dispersed source of power, thus reducing dependence on foreign energy sources. Other national benefits include the development of exports to underdeveloped countries where photovoltaic systems could be utilized for rural electrification and irrigation pumping. (ERA citation 04:051245)

DSE-3413-T1 PC **A02**/MF **A01**
Solarex Corp., Rockville, MD.
Photovoltaic Mechanisms in Polycrystalline Thin Film Solar Cells. Quarterly Technical Progress Report No. 2, January 1, 1979--March 31, 1979.
G. Storti, S. Johnson, H. C. Lin, and R. W. Armstrong. 1979, 24p
Contract ET-78-C-01-3413

The effect of grain size on short circuit current density was investigated by approximating individual silicon grains as right circular cylinders and solving the diffusion equation within the base region. This model confirms the previous results that for grain radii exceeding a few tenths of a millimeter, the minority carrier lifetime in the grain essentially determines the short-circuit current response of the cell. The dark I-V characteristics of some polycrystalline solar cells were measured and compared with single crystal cells. The dark current of the polycrystalline cells is dominated by recombination within the space-charge region well past the one sun maximum power point. This has the effect of lowering the cells output power and open circuit voltage. Single crystal cells are dominated by recombination within the quasi-neutral regions at the one sun maximum power point and, consequently, the fill factor and open circuit voltage are greater. Additionally, some preliminary measurements of the spatial dependence of diffusion length were made, Laue X-ray diffraction study of crystal orientations was performed and some SEM micrographs of polycrystalline wafers were taken. (ERA citation 04:051246)

EPRI-AF-811(V.1) PC **A04**/MF **A01**
Science Applications, Inc., Palo Alto, CA.
Fault Tree Analysis for Reliability Prediction of Gas Turbine Type Power Plants. Final Report.
J. E. Kelly, R. C. Erdmann, and K. Gilbert. Jun 78, 55p

This project was undertaken to determine if the fault tree methodology could be used to predict the reliability of a fossil fuel power plant. As a test case, a fault tree model was developed and evaluated for an existing gas turbine type power plant. The overall plant reliability prediction for producing steam for 500 consecutive hours was found to be 0.965. This value was considered reasonable by utility personnel. It was concluded that the fault tree technique was an applicable tool for reliability prediction of a gas turbine type power plant. (ERA citation 04:026176)

EPRI-AF-811(V.2App.) PC **A05**/MF **A01**
Science Applications, Inc., Palo Alto, CA.
Fault Tree Analysis for Reliability Prediction of Gas Turbine Type Power Plants. Volume 2. Appendixes. Final Report.
J. E. Kelly, R. C. Erdmann, and K. Gilbert. Jun 78, 85p

Fault tree analysis is a procedure used to examine systems to determine component failure modes and other events (e.g., operator errors) which can, individually or in combination, cause a system failure resulting in downtime. A system fault tree is a logic diagram which depicts the component failure modes and other fault events capable of producing, through AND and OR combinatorial logic, system failure. It is a binary model of the fault modes of a system and, as such, can be readily converted to a probabilistic model of the system. Individual component fault probabilities can be assigned to the model and combined to obtain system failure probabilities. The symbolism used in the fault tree analysis in this study is shown and defined. The gas turbine at the Naval Station plant studied is depicted. All the subsequent figures show the tree top and its 35 branches that were constructed in this study. (ERA citation 04:026177)

EPRI-EL-1102 PC **A05**/MF **A01**
Texas A and M Univ., College Station.
Effect of Operating Considerations on Reliability Indices Used for Generation Planning. Final Report.
A. D. Patton, and G. L. Hogg. Jun 79, 89p

Interest presently exists in examining the effects of system operating policies and constraints such as unit start-up times and start-up failures and flexibility to postpone outages on reliability indices used for generation planning. This interest stems from a desire to compute reliability indices that agree closely with actual system reliability performance and to evaluate the effect of different system operating constraints on reliability. A detailed Monte Carlo simulation computer program has been developed that is capable of incorporating the effects of many operating constraints on system reliability. This computer program represents a first step beyond the prototype, but not yet production grade, in the modeling of operating constraints. The present program was used to model 513 generating units and create an hour-by-hour artificial history of system capacity available and load. The program was developed in FORTRAN language and run on AMDAHL (compatible with IBM computers). It was used to study a synthetic system for illustration and to compare historical and comput-

ed reliability performance on an actual system. (ERA citation 04:049849)

EPRI-EM-1134 PC **A04**/MF **A01**
United Technologies Corp., South Windsor, CT. Power Systems Div.
Integral Cell Scale-Up and Performance Verification. Final Report.
L. M. Handley, W. E. Houghby, W. H. Johnson, T. G. Schiller, and H. Y. Stryker. Jun 79, 57p

The prime objective of the program was to scale the integral cell configuration ot the 4.8-MW Demonstrator cell size (3.7-ft exp 2) and test the full-size packages in short cell stacks to verify the acid management capability and document performance. The integral cell configuration is an arrangement in which the ribbed flow-field structures on the conventional phosphoric acid fuel cell separator are placed instead on the adjacent electrode substrates. The ribs continue to serve the functions of distributing reactant gas and conducting current and heat. The ribs are porous like the rest of the substrate and therefore can also be used to store electrolyte. Low-cost cell stack construction techniques devised in other programs were refined, and materials were modified to produce improved cell stack components. A 1530-hour test of a 20-cell stack demonstrated that the performance of the integral cell configuration was equivalent to that of the 4.8-MW Demonstrator configuration, and that increased acid inventories (necessary to meet endurance goals) could be accommodated in the electrodes without severe performance penalties. A second objective was to investigate improvements in acid cell stack technology that would be sufficient to allow a 20-percent reduction in total active cell area (and consequently lower cell cost) relative to the Demonstrator. Improvements to previously developed catalysts, catalyst layers, and application techniques were investigated, and subscale 2" x 2" single cell endurance tests were conducted. A 15-mV performance improvement over the Demonstrator performance projection was shown after 10,000 hours at 300 ASF, 375 exp 0 F, 50 psia endurance test conditions. The third objective was the initiation of a cell stack conceptual design incorporating the integral cell concept. (ERA citation 04:051842)

EPRI-ER-1099 PC **A08**/MF **A01**
Fluor Engineers and Constructors, Inc., Irvine, CA.
Heber Geothermal Demonstration Power Plant. Final Report.
Jun 79, 171p

The binary power plant is to be a 45 MW net electrical facility deriving energy from the low salinity (14,000 ppM), moderate temperature (360 exp 0 F, 182 exp 0 C) Heber reservoir in Southern California. The optimized baseline design established for the power plant is described, and the design and optimization work that formed the basis for the baseline design is documented. The work accomplished during Phase II, Preliminary Design is also recorded, and a base provided from which detailed plant design could be continued. Related project activities in the areas of licensing, environmental, cost, and schedule are also described. The approach used to establish the Phase II optimized baseline design was to (1) review the EPRI Phase I conceptual design and feasibility studies; (2) identify current design criteria and state-of-the-art technology; and (3) develop a preliminary design optimized to the Heber site based on utiliity standards. (ERA citation 04:054577)

EPRI-ER-513 PC **A09**/MF **A01**
Elliott Co., Jeannette, PA.
Preliminary Design of Axial Flow Hydrocarbon Turbine/Generator Set for Geothermal Applications. Final Report.
N. A. Samurin, and J. R. Shields. May 79, 179p

The design of a 65 MW (e) gross turbine generator set in which a hydrocarbon gas mixture is used as the motive fluid is outlined. The turbine generator set is part of a geothermal binary cycle electric power plant proposed for the Heber site in the Imperial Valley, California. Aerodynamic design considerations and estimated unit performance for three hydrocarbon gas mixtures are presented. Real gas properties and equations of state are reviewed as they affect the turbine design and the thermodynamic cycle. The mechanical designs for the casing, rotor dynamics, shaft sealing and unit construction are detailed. Support systems such as the lube and seal supply system, turbine controls, etc., are reviewed. An extensive hydrocarbon turbine general specification is also included. (ERA citation 04:046314)

EPRI-ER-685-SY(V.1) PC **A04**/MF **A01**
General Electric Co., Schenectady, NY. Electric Utility Systems Engineering Dept.
Requirements Assessment of Photovoltaic Power Plants in Electric Utility Systems. Volume I. Summary Report.
W. D. Marsh. Jun 78, 55p

This study developed a rational approach to the consideration of solar photovoltaic (PV) power plants applied to electric utility systems, then performed a requirements assessment and preliminary impact and penetration analyses by studying PV generation in three actual utility systems. Conventional utility loss-of-load probability and production simulation methods were used, along with a PV plant performance model developed for the study. Evaluations were based on comparison of total utility generation system costs with and without PV plants. The study determined that it is possible rationally to calculate a long-term probabilistic firm capacity value of PV plants in utility systems. However, further investigation and operating experience are required before it will be known how much actual installed capacity credit may be justified. Dedicated energy storage as an integral part of a PV plant was recognized to offer no advantage because it does not optimize the total energy supply system of the utility. Moreover, cost/value relationships were found to be unfavorable. (ERA citation 04:025933)

EPRI-ER-685(V.2) PC **A17**/MF **A01**
General Electric Co., Schenectady, NY. Electric Utility Systems Engineering Dept.
Requirements Assessment of Photovoltaic Power Plants in Electric Utility Systems. Volume II. Technical Report.
W. D. Marsh. Jun 78, 383p

This study developed a rational approach to the consideration of solar photovoltaic (PV) power plants applied to electric utility systems, then performed a requirements assessment and preliminary impact and penetration analyses by studying PV generation in three actual utility systems. Conventional utility loss-of-load probability and production simulation methods were used, along with a PV plant performance model developed for the study.Evaluations were based on comparison of total utility generation system costs with and without PV plants. The study is reported under the following sections: 1) geographic areas for photovoltaic power plants; 2) siting of photovoltaic power plants; 3) electric utility characteristics; 4) photovoltaic power plant characteristics; 5) methods of study; 6) study inputs; 7) results; 8) cost and performance goals for viability; 9) reference PV selection; 10) reference PV plant definitions; 11) comparison with conventional generation; 12) requirements for PV applications; 13) preliminary impact analysis; and 14) preliminary penetration analysis. (ERA citation 04:025934)

EPRI-ER-978(V.3) PC **A05**/MF **A01**
General Electric Co., Schenectady, NY. Electric Utility Systems Engineering Dept.
Requirements Assessment of Wind Power Plants in Electric Utility Systems. Volume 3. Appendixes. Final Report.
W. D. Marsh. Jan 79, 95p

This study first developed a rational approach to the consideration of wind power plants applied to electric utility systems, then performed a requirements assessment and preliminary impact and penetration analyses by studying wind generation in three actual utility systems. Conventional utility loss-of-load probability and production simulation methods were used together with a wind turbine generator (WTG) performance model developed for the study. Evaluations were based on comparison of total utility generation system costs with and without wind plants, and were expressed in terms of wind power plant value and cost. Value is measured by the value of displaced energy and capacity of conventional power plants. Cost consists of the capital, and operating and maintenance costs of the wind plant. (ERA citation 04:049841)

EPRI-FP-1061 PC **A05**/MF **A01**
California Univ., Berkeley. Dept. of Materials Science and Mineral Engineering.
High Strength Austenitic Alloys for Generator Retaining Rings. Interim Report.
J. W. Morris, Jr., and G. Thomas. Apr 79, 94p

The constraints placed on a retaining ring in service require that it be made of a non-magnetic alloy which has high strength and toughness and is resistant to degradation in either dry or damp hydrogen. The specific objective adopted for this project was to develop a non-magnetic, hydrogen resistant alloy which could achieve strength levels near 200 ksi yield with good residual toughness while permitting processing primarily through thermal treatment. During the first two years of this project the research has concentrated on achieving strength and toughness objectives, using alloys which have at least tentatively met the other necessary criteria. Given the promising strength and toughness properties obtained in research to date, particularly with precipitation hardened alloys based on the Fe--Ni--Ti--Ta system, fatigue and fracture toughness testing in hydrogen has been initiatd to determine suitability of these alloys for use in a hydrogen environment. Further research will be conducted to optimize alloy properties given results of these tests. (ERA citation 04:046554)

EPRI-FP-995 PC **A04**/MF **A01**
Curtiss-Wright Corp., Wood-Ridge, NJ.
Cost Estimate of Fluidized Bed Combustor Air Heater for Gas Turbines. Final Report.
R. Schaefer. Feb 79, 56p

This program consisted of a study of the performance, design concept and capital cost of an unconventional coal-burning, gas turbine, electric power generation system including an indirect-fired air heater in the form of a pressurized fluidized bed (PFB) operating near stoichiometric fuel/air ratios. The system has two special features. One is the use in a turbine of clean air heated by the PFB to produce most of the electrical energy of the system. The other is the use of reduced temperature combustion gases from the PFB in an expander which has been used in industrial applications having similar erosive environment. Various cycles were evaluated, and one was selected for conceptual design and cost estimates. Indications of system reliability and factors to be resolved by research and development are presented. Capital cost of the system per installed kilowatt is higher than for the base design PFB system by about 20%. This base design PFB being developed for the Department of Energy (DOE), does not use a clean air turbine/dirty gas expander as studied here and has a higher bed operating temperature. The higher cost is due primarily to the separate compressor-expander-generator equipment associated with the combustion air system and to the additional number of gas turbine modules to provide the same power plant rating with a reduced turbine inlet temperature. Based on current fuel price levels, the power generation cost with this system is 20% higher than with the base PFB system and 28% lower than with oil-fired connventional boiler systems. (ERA citation 04:053137)

EUR-6116-EN PC **A02**/MF **A01**
Commission of the European Communities, Ispra (Italy). Joint Research Centre.
Solar Gas Turbine.
A. Angelini. 1978, 9p
U.S. Sales Only.

The thermal cycle described refers to a solar power plant (field of mirrors reflecting on a central receiver) coupled with a gas turbine. The originality of the plant consists in having divided the receiver (put at the top of the solar tower) into two parts, connected with the first and the second stage of the turbine respectively. This allows a thermal cycle with gas reheating and hence high values of the thermal efficiency. (ERA citation 04:051270)

FCR-0571 PC **A02**/MF **A01**
United Technologies Corp., South Windsor, CT. Power Systems Div.
Venture Analysis Case Study for on-Site Fuel Cell Energy Systems. Monthly Technical Status Report No. 3.
J. D. Brown. Sep 77, 23p
Contract EX-77-C-01-2684

The case study for the on-site fuel cell energy system consists of an energy service offering by gas utilities in which all energy needs of individual buildings are provided by energy systems incorporating on-site fuel cell powerplants. With this approach, the gas utility would own the powerplant and recover costs through the consumer's monthly payments. The equipment manufacturer's customers are the gas utilities. The activities during this reporting period have developed the computer programs and appropriate inputs to those programs to define the market model and the extension of that model to the national level. The market characterization is based on established data and will be the foundation for subsequent analyses. While developing the market model for the case study, a preliminary approximate analysis was conducted to indicate gross effects, and to confirm methodology. The market for the on-site fuel cell energy system includes existing and new commercial and light-industrial and multi-family dwellings. To evaluate the market potential and associated value-in-use price for the fuel cell energy system, it is necessary to establish the overall building requirements on an individual basis and to project these results to the national level. A market model was developed, which will provide for energy system comparisons at the individual building level, to project the overall market to the national level. The market model and information inputs required for the analysis are discussed. (ERA citation 04:055146)

FCR-0589 PC **A05**/MF **A01**
United Technologies Corp., South Windsor, CT. Power Systems Div.
Venture Analysis Case Study for on-Site Fuel Cell Energy Systems. Monthly Technical Status Report No. 4.
J. D. Brown. 10 Nov 77, 93p
Contract EX-77-C-01-2684

The detailed market model for on-site fuel cell power plants has been completed and the remaining input information developed. Key elements of the input development included definition of the building energy characteristics on a statistical basis, the development of utility rate schedules with an estimate of projected increases, and a projection of the building inventory (square footage) by region and type. The building energy characteristics (thermal and electrical use) were developed utilizing statistical correlations of building energy use in over 500 buildings. The energy use was developed in relation to weather, building type, and other variations. Much of the data for developing the building energy use was collected in the on-site fuel cell program conducted by Power System Division in conjunction with a number of gas utility companies (TARGET Program). Appendix I summarizes the individual buildings included in the data source, describes the nature of the information collected, presents correlations for selected building types, and includes computer printouts of the thermal, electrical and resource consumption of eight individual building types. This information is included to illustrate the nature of the analysis and to provide an additional data source for other studies of building energy use patterns. (ERA citation 04:055147)

FE-1514-88 PC **A07**/MF **A01**
Westinghouse Electric Corp., Madison, PA. Advanced Coal Conversion Dept.
Advanced Coal Gasification System for Electric Power Generation. Third Quarterly Progress Report, April 1-June 30, 1978.
H. K. Altiner, E. J. Chelen, and P. Cherish. 30 Nov 78, 126p
Contract EF-77-C-01-1514

Operation of the PDU was directed to testing the gasifier reactor. The goals of the testing programs were to evaluate the performance of the gasifier with the expanded free-board section using direct coal feed and to assess the effectiveness of the upgraded gas quench-waste system. These goals were accomplished with Tests TP-015, -016 and -017. Other, more specific test objectives were also realized, and these are described. Heat and material balances as well as product characterization analyses were also accomplished and are included. Over 500 hours of operation were achieved with approximately 270 hours being logged using a highly-caking Pittsburgh seam coal feedstock. High carbon conversions were achieved in all tests with the various feedstocks used. The first operation of the gasifier with the newly-installed oxygen supply system was attempted in Test TP-018-1. Also undergoing initial testing was the modified oxidant tube which was changed to accommodate a reduction in operating pressure from 230 to 150 psig. Experimental tests and analysis of data were carried out on jet phenomena, distributor design, draft tube design and particle entrainment. The jet penetration correlation developed for the multiple vertical jets was compared with published correlations and found to provide improved predictive capability. A comparison of the data and the model is presented. Experiments to study gas entrainment into a jet in the fluidized bed were partially completed. (ERA citation 04:052449)

FE-1542-35 PC **A07**/MF **A01**
Arnold Engineering Development Center, Arnold Air Force Station, TN.
Report on the MHD Performance Demonstration Experiment, October 1, 1976-September 30, 1977.
H. J. Schmidt, G. W. Garrison, G. L. Whitehead, H. L. Henderson, and B. L. Seiber. Mar 78, 150p
Contract EX-76-A-01-1542

The Arnold Engineering Develoment Center (AEDC) has been under contract since December 1973 to modify existing equipment and to design, fabricate, and install new hardware to perform an MHD Performance Demonstration Experiment. The objective of the experiment is to demonstrate that a generator simulating a commercial-sized device can convert 16 to 18 percent of the available thermal energy into electrical power. The fabrication and installation of hardware for the test during the period from October 1, 1976 to September 30, 1977, are described. Prior to October 1976, existing equipment and facilities were renovated and major new hardware was designed and fabricated. In the past year, fabrication of most of the hardware has been completed and assembly of the generator channel and magnet system was started. The assembly of one of the five channel sections was completed and is described. The aluminum force containment structure and coils for the magnet were completed and delivered to AEDC. The magnet assembly was completed up to the installation of the first lower coil pancake (40 turns). An independent structural analysis of the force containment structure was completed and resulted in several minor modifications being recommended. Burner testing was performed without the diagnostics section which was not available and four firings with an accumulated time of 29 sec were performed and the results presented. Burner testing will be continued into the first quarter of next year with additional diagnostic probes. (ERA citation 04:055134)

FE-1542-36 PC **A02**/MF **A01**
Arnold Engineering Development Center, Arnold Air Force Station, TN.
MHD High Performance Demonstration Experiment. Quarterly Progress Report, January 1-March 31, 1978.
Apr 78, 20p
Contract EX-76-A-01-1542

The assembly of the magnet continued, the generator channel assembly was completed, and burner testing was resumed. Channel assembly operations were completed approximately two weeks ahead of schedule, even though the operation was approximately four weeks behind schedule at the start of the quarter. At the close of the quarter, seven of the nine upper coil pancakes had been installed and the eighth pancake was in position for final placement on the magnet. Burner testing was resumed; however, only one firing with the traversing pressure probe and electrode test assembly installed was performed. (ERA citation 04:055135)

FE-1760-30 PC **A04**/MF **A01**
Tennessee Univ., Tullahoma. Space Inst.
Development Program for MHD Direct Coal-Fired Power Generation Test Facility. Quarterly Technical Progress Report, July-September 1977.
J. B. Dicks, Jr., H. P. Markant, and R. C. Attig. 15 Oct 77, 67p
Contract EX-76-C-01-1760

Tests conducted in the existing MHD facility supported areas critical to the design of components for the new intermediate-size, direct coal-fired MHD development facility. A new combustor design concept was developed and tested. In the coal to oxygen ratio studies, equilibrium combustion calculations of the combustion process were carried out for various values of oxidant ratio. This was done to better understand the tradeoffs between satisfactory MHD generator performance and acceptable NO/sub x/ emissions. To improve inverter efficiency, the criteria for specifying filtering of the MHD channel's voltage and current output is defined. Dynamic combustor pressure measurements are discussed. The two-dimensional time dependent calculations of MHD generators presented is an attempt to develop a computer program which will enable the investigation of several types of problems occurring in a combustion gas driven MHD generator. The establishment of a chemical and fuels laboratory is defined. The status of the construction of the new MHD development facility is reported. The materials program reports on the statistical analysis of coal samples. Experiments were performed to determine the feasibility of plasma spraying various coatings on copper, and to optimize the spraying conditions for the various coatings. Visits were made to other materials laboratories in order to formulate a materials research plan at UTSI. A new electrode system was designed to allow better control of the insulator-wall temperatures so that in situ wall slag electrical conductivity can be measured under more refined control conditions. (ERA citation 04:055141)

FE-2341-10 PC **A03**/MF **A01**
Stanford Univ., CA. High Temperature Gasdynamics Lab.
High Magnetic Field MHD Generator Program. Quarterly Report, September, 1978.
R. H. Eustis, C. H. Kruger, M. Mitchner, S. A. Self, and J. K. Koester. Oct 78, 38p
Contract EX-76-C-01-2341

A series of experiments was conducted in the Stanford M-2 generator to investigate plasma non-uniformities and instabilities. Excellent agreement was obtained with earlier results which showed an increase in property fluctuations with increasing current and magnetic field compared to values without current or magnetic field. Data were taken over a much wider range of conditions than earlier and are only partially reduced at this time. Luminosity measurements which indicate plasma conductivity were made and fluctuations have been correlated with pressure, current, and electric field fluctuations. The correlation is strongest with current. The predominately low frequency fluctuations suggest that relatively large scale non-uniformities exist in the generator channel. A Langmuir probe has been used successfully to measure electron density in an MHD channel with the advantage of spatial resolution over line-of-sight averaged methods. Fabrication of the 6 Tesla disk and linear channels is nearing completion. (ERA citation 04:055143)

FE-2357-24 PC **A10**/MF **A01**
General Electric Co., Schenectady, NY. Energy Systems Programs Dept.
CFCC Development Program. Annual Progress Report, July 1976--June 1977.
Sep 78, 225p
Contract EX-76-C-01-2357

During the first year of the CFCC development program substantial progress was made in establishing a commercial plant concept. The overall approach to the commercial plant design evaluation with supporting technology tasks has been defined. Reliability studies and evaluation of alternate plant designs were conducted in parallel with the design activity. An environmental assessment was also conducted in parallel with the design activity. The test results have confirmed the basic assumptions on heat transfer and several configurations using the same basic tube bundle that have been evaluated. The hot gases generated in the combustor steam generator must be subsequently cleaned up, i.e., a high percentage of particulate matter removed in the hot gas clean-up system, before they are expanded in the gas turbine. The

initial emphasis in the hot gas clean-up effort was to compile existing efflux data and analyze it to develop an efflux characterization. A second step is then to determine the particulate removal capabilities of existing clean-up devices as a function of particle size distribution. The basic corrosion problem in the gas turbine and in the combustor steam generator arises from the chemical species in the gas stream from a fluid bed combustor. An analytical effort is in progress to better define these various species, the parameters which effect their generation and deposition, and an assessment of their quantities and states at the time that they reach the first stage of the gas turbine. (ERA citation 04:053143)

FE-2357-30 PC **A08**/MF **A01**
General Electric Co., Schenectady, NY. Energy Systems Programs Dept.
CFCC Development Program. Commercial Plant Reliability and Maintainability Evaluation (Task 1.4).
Oct 78, 158p
Contract EX-76-C-01-2357

The Coal Fired Combined Cycle (CFCC) is the unique powerplant concept developed under the leadership of the General Electric Company to provide a direct coal-burning gas turbine and steam turbine combined cycle powerplant. The advantages of the combined cycle for higher efficiency and the potential of the pressurized fluidized bed (PFB) combustor for improvements in emissions could offer a new and attractive option to the electric utility industry, after its successful development. The CFCC approach provides cooling of the fluid bed combustor through the use of steam tubes in the bed, which supply a steam turbine-generator. The partially cooled combustion gases exiting from the combustor drive a gas turbine-generator after passing through a hot-gas cleanup train. On the basis of previous studies and confirming work under this contract, General Electric continues to believe that the CFCC approach offers important advantages over alternate approaches: higher powerplant efficiency in the combustor temperature range of interest; reduced combustor/steam generator corrosion potential, due to low fluid-bed tube temperature (as contrasted to the air in tube cycle); reduced hot-gas cleanup flow rate (as contrasted with the uncooled combustor cycle); and increased gas turbine bucket life from improved material protection systems. The present report involves mainly a failure mode analysis for components of the plant. (ERA citation 04:054613)

FE-2357-43 PC **A03**/MF **A01**
General Electric Co., Schenectady, NY. Energy Systems Programs Dept.
PFB Coal Fired Combined Cycle Development Program: Management Plan Update.
33p
Contract EX-76-C-01-2357

The follow-on program concentrates continuing activity in two major technology tasks of the current CFCC program, hot gas cleanup and gas turbine life, with supporting effort in several other areas. The prime thrust of the follow-on program is in Gas Turbine Technology and Hot Gas Cleanup. Work to date has identified the needs to protect the gas turbine from corrosion caused by substantial amounts of alkali in the submicron aerosol and vapor phase and to protect the turbine from erosion caused by multimicron-sized particulates. We believe that a solution to the corrosion protection challenge can more confidently and quickly be found by extending turbine materials work in dirty liquid fuels to the PFB environmental levels. Particulate removal for erosion protection has as its objective a better quantification of the erosion tolerance level coupled with work to improve the performance of inertial separators, including electrostatic augmentation, in the less-than-15 mu m-particle-size region. Interaction between the ongoing technology and test programs at the Coal Utilization Research Laboratory will be by the described tests to be performed. Additionally, use will be made of the results of the Fireside II Corrosion Program results from the planned 1000-hour test at the Exxon mini-plant PFB. The follow-on effort, then, is keyed to the results of these PFB tests and conclusions reached from in-depth parallel laboratory investigations and analysis. (ERA citation 04:054617)

FE-2357-44 PC **A03**/MF **A01**
General Electric Co., Schenectady, NY. Energy Systems Programs Dept.
CFCC Development Program. Quarterly Report, April-June 1978.
Nov 78, 33p
Contract EX-76-C-01-2357

A formal Design Review of the Commercial Plant Baseline Design was conducted. At this stage in the development of the Coal-Fired, Combined-Cycle concept, it was generally agreed by the review team that the GE program team has defined a reference plant configuration suitable for potential expansion to the definitive design of a pilot plant. The testing of shrouded hot gas ducting at a size and temperature of the CFCC configuration has been completed. The results of these tests indicate that the transfer line design is believed to be suitable for the CFCC conditions, and on this basis, Foster Wheeler is willing to provide commercial offerings at the CFCC conditions. Small burner rig simulation testing continues. PFB-5PM and PFB-6PM, after 5400 hours of simulated exposure in the burner rig are still in good condition. Over 5000 hours of small burner rig testing has been completed. The results, thus far, indicate high aluminum CoCrAlY claddings possess superior corrosion resistance in the 1600 exp 0 F environment. Activated diffusion bonding of MS5001 blade tips has proved successful, and the mechanical property evaluation of selected claddings continues. Cold flow testing of the Developmental Cyclone has been completed. The implementation of increased disengagement length and outlet skimming (2 1/2% of flow) led to approximately 60% reduction in outlet dust loading relative to Stairmand high efficiency device. (ERA citation 04:053138)

FE-2455-77-5 PC **A03**/MF **A01**
Burns and Roe, Inc., Woodbury, NY.
Conceptual Design of an Atmospheric Fluidized-Bed Combustion Electric Power Generating Plant. Quarterly Technical Progress Report, January-March 1978.
E. J. Cosgrove. Apr 78, 27p
Contract EF-77-C-01-2455

The scope of this program is to perform all services to prepare a conceptual design in sufficient detail to describe and estimate cost and economics for an atmospheric fluidized-bed combustion (AFBC) electric power generating plant, and to optimize the production of electric power and any by-products from coal. As a minimum, the work shall produce a conceptual design, drawings, outline specifications, capital and operating cost estimates and documentation of all related analyses, calculations and studies for the commercial size plant. Of particular importance is the recommendation and conceptual design for scale down of the commercial plant to a size that will demonstrate the feasibility of the selected process. Based on the original program scope, the project is 99.8% complete and the expanded program is 70% complete. (ERA citation 04:054615)

FE-2468-37 PC **A06**/MF **A01**
Engineering Societies Commission on Energy, Inc., Washington, DC.
Plan for the Development of Fuel Processors for Fuel Cell Systems. Final Report on Task 008.
A. S. Wilk. Nov 78, 106p
Contract EF-77-C-01-2468

A plan for the development of fuel processors for dispersed applications of fuel cell systems is documented. Dispersed refers to applications of small size which cannot economically tolerate the complexities of coal handling. Consequently, the fuel processors considered in the plan are limited to those which produce a hydrogen-rich fuel cell feed from liquid and gaseous hydrocarbon fuels, which are petroleum-derived or coal-derived. State-of-the-art for fuel processors is taken to be steam reforming as developed by United Technologies Corporation (UTC). The UTC reformer extends the theme of conventional reforming by utilizing a conventional steam reforming catalyst in a compact unit which demonstrates good load-following characteristics. Load-following is an important requirement of most dispersed applications of fuel cell systems. Like conventional steam reforming, the UTC reformer is limited to relatively lighter and cleaner hydrocarbon fuels (190 exp 0 C maximum end point naphtha contaning 0.5 vppm sulfur maximum). The direction of the plan is to support the demonstration of fuel cell systems by uncovering needs and developing technologies that will facilitate the commercial application of the state-of-the-art reformer. Due to the future uncertainties of fuels availability, the plan is also directed towards broadening the range of fuels that may be converted to a hydrogen-rich fuel cell feed to include heavier petroleum-derived and coal-derived hydrocarbon liquids. (ERA citation 04:053383)

FE-2612-25 PC **A05**/MF **A01**
Rockwell International Corp., Canoga Park, CA. Rocketdyne Div.
Advanced Coal Fueled Combustor/Heat Exchanger Technology Study. Quarterly Technical Progress Report No. 5, October-December 1978.
J. Campbell, Jr. 1978, 79p
Contract EF-77-C-01-2612

This effort constitutes the first phase of what is expected to be a three-phase program to advance coal fueled combustor/heat exchanger technology. The technology would be utilized in conjunction with high temperature closed cycle gas turbine, (CCGT), power conversion systems. The present effort consists entirely of studies, analysis, design, and reporting. No fabrication or test effort is involved. This 1977--1978 effort was concerned with CCGT cycles and heat exchangers appropriate for a 350 MWe unit size central station application. A contract extension was granted to Rockwell International to provide additional effort to establish relevant CCGT system designs, particularly primary heater designs, suitable for smaller generating systems providing both electric power in the 25 to 50 MWe range and useful process heat. Such systems would be expected to find application in cogeneration service in large industrial plants, or in district heating applications, etc., where the simultaneous demand for both process heat and electrical power permits added economies in fuel utilization. (ERA citation 04:053139)

FE-2613-6(V.2B) PC **A13**/MF **A01**
General Electric Co., Philadelphia, PA. Space Div.
MHD-ETF Program Final Report, January 4, 1977--March 4, 1978. Volume 2B, Parts 3, 4, and 5. Reference Design Description.
Mar 78, 299p
Contract EF-77-C-01-2613

The ETF system configuration is a 250 MWt size, coal fired, MHD/Steam combined cycle plant. The steam turbine bottoming cycle operates with steam conditions of 3500 psia/1000 exp 0 F at the exit of the steam generator. The steam is then throttled to 2400 psia/950 exp 0 F to match the subcritical turbogenerator. The MHD topping cycle employs a fluidized bed gasifier/double vortex cyclone combustor subsystem which delivers plasma at a temperature of 4508 exp 0 F when preheated air is supplied to the second stage combustor at 2983 exp 0 F by a passively controlled, high performance, indirectly oil fired, ceramic regenerative heat exchanger subsystem. The MHD generator is a subsonic linear channel with 16% generator enthalpy extraction. The test and operating philosophy of the ETF is documented including test objectives, modes of operation, and overall operating plans. Functional specifications for components and subsystems of the ETF considered to be balance-of-plant, supportive subsystems, are presented. Also diagrams and drawings of the ETF layout and balance-of-plant subsystems are included. (ERA citation 04:053364)

FE-2613-6(V.4A) PC **A15**/MF **A01**
General Electric Co., Philadelphia, PA. Space Div.
MHD-ETF Program Final Report, January 4, 1977--March 4, 1978. Volume 4A. Appendices A01--A03.
Mar 78, 330p
Contract EF-77-C-01-2613

A comparison of cyclone and fluidized bed combustor concepts for open cycle MHD is given. Also detailed design considerations for a two-stage, cyclone combustor for open cycle MHD and a two-stage, fluidized bed combustor for open cycle MHD are presented. The studies were performed

to establish a reference design for the Magnetohydrodynamic Engineering Test Facility. (ERA citation 04:053369)

FE-2613-6(V.4B) PC **A11**/MF **A01**
General Electric Co., Philadelphia, PA. Space Div.
MHD-ETF Program Final Report, January 4, 1977--March 4, 1978. Volume 4B. Appendices A04--A08.
Mar 78, 249p
Contract EF-77-C-01-2613

This appendix to the design report for the MHD Experimental Test Facility contains detailed studies on (1) MHD generator performance and heat transfer analysis, (2) performance analysis for Faraday and diagonal channels, (3) generator performance for alternate system conditions, (4) an alternate ETF system with two-stage cyclone combustor, and (5) ETF system options. (ERA citation 04:053367)

FE-2613-6(V.4C) PC **A11**/MF **A01**
General Electric Co., Philadelphia, PA. Space Div.
MHD-ETF Program Final Report, January 4, 1977--March 4, 1978. Volume 4C. Appendices A09--A16.
Mar 78, 230p
Contract EF-77-C-01-2613

Design requirements and specifications are given for some components of the MHD Experimental Test Facility. The Faraday channel structural/mechanical design; the diagonal channel structural/mechanical design; nozzle design; diffuser performance; diffuser and expansion joint structural/mechanical design; magnet and support systems design and specifications; and the design and specifications for the inverters and electrode control for both the Faraday and diagonal wall generator are presented in detail. (ERA citation 04:053370)

FE-2613-6(V.4D) PC **A14**/MF **A01**
General Electric Co., Philadelphia, PA. Space Div.
MHD-ETF Program Final Report, January 4, 1977--March 4, 1978. Volume 4D. Appendices A17--A25.
Mar 78, 312p
Contract EF-77-C-01-2613

The design and specifications are given for some components of the MHD Experimental Test Facility. The alternate design and reference design are given for the high temperature air heaters. Design and specifications are given for the spoiler/radiant boiler, seed separators, and steam generator sections and heat recovery components. Also plans for implementing the required ETF integrated control subsystem are detailed; the Engineering Data Acquisition Subsystem is described; and instrument and control measurement and cabling lists are included. MHD effects on instrumentation are discussed. (ERA citation 04:053371)

FE-2613-6(V.4E) PC **A17**/MF **A01**
General Electric Co., Philadelphia, PA. Space Div.
MHD-ETF Program Final Report, January 4, 1977--March 4, 1978. Volume 4E. Appendices A26--A28.
Mar 78, 390p
Contract EF-77-C-01-2613

A cooling tower trade-off study and NO/sub x/ kinetic analysis for the MHD Experimental Test Facility (ETF) are presented. An assessment of the ETF reliability, maintainability, and availability requirements is given. Studies include MHD-ETF failure rates and estimated maintenance elapsed time outages and manhours required per failure, fault trees for ETF combined cycle operation, and failure mode effect analysis. (ERA citation 04:053365)

GA-A-15322 PC **A04**/MF **A01**
General Atomic Co., San Diego, CA.
Closed-Cycle Gas Turbine - a Proven Cogeneration Plant Adaptable to Fossil, Nuclear, and Solar Heat Sources.
C. F. McDonald. Jun 79, 71p CONF-790383-1
Contract EY-76-C-03-0167
Conference on energy conversion and solar energy, Milan, Italy, 26 Sep 1979.

The paper reviews existing operational CCGT plants and projects nuclear, fossil, and solar plants of the future. Perhaps the singularly most important benefit of the CCGT is its inherent cogeneration capability. The paper concludes that worldwide efforts to bring the CCGT plant into use should increase rapidly, since this type of plant can significantly aid in meeting national energy goals. (ERA citation 04:051417)

GA-A-15340 PC **A02**/MF **A01**
General Atomic Co., San Diego, CA.
Fixed Mirror Solar Concentrator for Application to a 100 MW(E) Electric Generating Plant.
J. R. Schuster, J. M. Neill, and J. Bass. May 79, 6p CONF-790803-10
Contract ET-78-C-03-2240
14. intersociety energy conversion conference, Boston, MA, USA, 5 Aug 1979.

A design study was performed of a 100 MW(e) power plant that uses a Fixed Mirror Solar Concentrator (FMSC) to supply energy for steam generation. Various heat transport fluids were considered and draw salt was selected over Therminol 88 and sodium. The complete plant was modeled in a cost performance optimization code which automatically performed trade-offs such as reduced blocking vs increased piping costs, field piping heat loss vs pumping power, and fluid outlet temperature vs overall system efficiency. Various collector and receiver designs were studied and evaluated for their cost effectiveness. Operational requirements impacting the component designs were identified. (ERA citation 04:049662)

HCP/T5433-01 PC **A04**/MF **A01**
Wizard Research and Development Group, Inc., Washington, DC.
Criteria for an Ideal Solar Photovoltaic Powered Industry.
Jun 79, 74p
Contract ET-78-X-01-5433

A study based on the results of a literature survey on the application of solar photovoltaic energy and the use of energy in the Primary Metals Industries is given. A criteria is outlined for an ideal solar photovoltaic powered industry and the Primary Metals industries is evaluated with respect to this criteria. Some of the major findings of this report are: (1) The most important requirements of an ideal solar photovoltaic powered industry are the ability to use dc electrical power, ability to be located in Southern California or the Southwestern US and ability to do without power for extended periods of time. (2) The costs of varying from the ideal are most severe with respect to the loss of power element of the criteria. (3) Although most of the industries in the Primary Metals group use tremendous amounts of electrical energy, the general requirements of an uninterruptable power source makes them less than ideal users of photovoltaic energy. (4) It appears to be both technologically and economically feasible to develop processes which would make at least four of the seven members of the Primary Metals Industries ideal solar photovoltaic powered industries. (ERA citation 04:052805)

JPL-PUB-79-38 PC **A05**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
High-Efficiency Thin-Film GaAs Solar Cells. Final Report.
R. J. Stirn. 15 Apr 79, 98p
Contract EG-77-A-29-1074

Results of a solar cell research task to demonstrate the feasibility of producing high-efficiency (15% or greater) thin-film GaAs solar cells with costs suitable for terrestrial power generation are reported. The approach is that of growing GaAs by organometallic chemical vapor deposition on recrystallized Ge films previously deposited on metal substrates, and fabricating AMOS solar cells on the GaAs. Studies of the interfaced oxide layer of AMOS single-crystal solar cells are reported. Several oxides were investigatd using a 50-watt CO sub 2 laser. Experiments with Ga/Ag SB metallization for stability testing were inconclusive. Continuing life testing experiments at elevated temperatures show promising results. Germanium recrystallization studies and GaAs growth on Ge layers is reported. Studies of AMOS solar cells made on polycrystalline GaAs thin films are presented. (ERA citation 04:051247)

LBL-9214 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Measurement and Analysis of Circumsolar Radiation.
D. F. Grether, D. Evans, A. Hunt, and M. Wahlig. Apr 79, 9p
Contract W-7405-ENG-48

This project uses specially developed instruments to measure the solar and circumsolar radiation for application to solar energy systems that employ concentrating collectors. The instruments, which consist of scanning telescopes mounted on a precision solar tracker, and their locations are described. The data processing capabilities, which aid in the analysis of the performance of each instrument system, are discussed. Data supplied by LBL to others are also mentioned. Recent colored filter data are shown and a comparison of circumsolar radiation data obtained at Atlanta and Barstow is given. (ERA citation 04:051211)

LBL-9464 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Basic Theory and Equations Used in the Two-Phase Multidimensional Geothermal Reservoir Simulator, SHAFT79.
K. Pruess, and R. C. Schroeder. Jul 79, 5p
CONF-790906-14
Contract W-7405-ENG-48
Geothermal Resources Council annual meeting, Reno, NV, USA, 24 Sep 1979.

The algorithm of SHAFT79 is based on mass and energy balance equations for two-phase flow in a porous medium. These basic equations are formulated as Integrated Finite Difference equations. The latter formulation allows both regular and irregular discrete grid approximations of reservoir geometry. The present version of SHAFT79 solves the non-linear mass and energy equations simultaneously using an efficient linear algebra package. The computer program is being applied to a vareity of problems to study both real reservoir behavior and to better understand the physics of two-phase systems. The types of applications include idealized one- and two-phase reservoir depletion, two-phase reservoir behavior with distributed liquid, simulation of real reservoirs, matching production data, and estimating material parameters from well test data. (ERA citation 04:051342)

N80-10594/3 PC **A07**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Some Techniques for Reducing the Tower Shadow of the DOE/NASA MOD-0 Wind Turbine Tower.
Final Report.
R. R. Burley, J. M. Savino, L. H. Wagner, and J. H. Diedrich. Sep 79, 129p NASA-TM-79202, DOE/NASA/20370-79/17
Contract DE-AB29-76-ET20370

Wind speed profile measurements to measure the effect of a wind turbine tower on the wind velocity are presented. Measurements were made in the wake of scale models of the tower and in the wake of certain full scale components to determine the magnitude of the speed reduction (tower shadow). Shadow abatement techniques tested on the towers included the removal of diagonals, replacement of diagonals and horizontals with round cross section members, installation of elliptical shapes on horizontal members, installation of airfoils on vertical members, and application of surface roughness to vertical members.

N80-10595/0 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Nasa-Lewis Closed-Cycle Magnetohydrodynamics Plant Analysis.
P. F. Penko. 1979, 13p NASA-TM-79249, DOE/NASA-2674-79/7
Contract EF-77-A-01-2674
Conf-Presented at Closed-Cycle Magnetohydrodynamics Specialists Meeting, Bozeman, Montana, 21 Jun. 1979.

A brief review of preliminary analyses of coal fired closed cycle MHD power plants is presented. The performance of three power plants with differing combustion systems were compared. The combustion systems considered were (1) a direct coal-fired combustor, (2) a coal gasifier with in-bed desulfurization and (3) a coal gasifier requiring exter-

nal fuel gas cleanup. Power plant efficiencies (auxiliary power excluded) were 44.5, 43, and 41 percent for the three plants, respectively.

N80-10597/6 PC **A02**/MF **A01**
SRI International Corp., Menlo Park, Calif.
Novel Duplex Vapor: Electrochemical Method for Silicon Solar Cells.
Quarterly Progress Report, 1 May - 31 Jul. 1979.
L. Nanis, A. Sanjurjo, and K. Sancier. 31 Aug 79, 21p NASA-CR-162387, DOE/JPL-954471-79/11
Contracts NAS7-100, JPL-954471
Subm-Prepared for JPL.

The scaled up chemical reactor for a SiF4-Na reaction system is examined for increased reaction rate and production rate. The reaction system which now produces 5 kg batches of mixed Si and NaF is evaluated. The reactor design is described along with an analysis of the increased capacity of the Na chip feeder. The reactor procedure is discussed and Si coalescence in the reaction products is diagnosed.

N80-10603/2 PC **A04**/MF **A01**
Energy Research Corp., Danbury, Conn.
Technology Development for Phosphoric Acid Fuel Cell Powerplant, Phase 2.
Quarterly Report.
L. Christner. Jun 79, 72p NASA-CR-159705, DOE/NASA/0067-79-2
Contract DEN3-67
Subm-Prepared for DOE.

A technique for producing an acid inventory control member by spraying FEP onto a partially screened carbon paper backing is discussed. Theoretical analysis of the acid management indicates that the vapor composition of 103% H3PO4 is approximately 1.0 ppm P4O10. An SEM evaluation of corrosion resistance of phenolic resins and graphite/phenolic resin composites in H3PO4 at 185 C shows specific surface etching. Carbonization of graphite/phenolic bipolar plates is achieved without blistering.

PB80-103948 PC **A03**/MF **A01**
International Science and Technology Inst., Inc., Washington, DC.
Hydro for the Eighties: Bringing Hydroelectric Power to Low Income People, The Workbook. A Slide Presentation--Audio Cassette and Workbook.
Sep 79, 44p CSA/LN-2435
Contract CSA-B9AA-007
See also report dated Apr 79, PB-296 238.

The workbook presents the rationale for developing low-cost hydroelectric power. Simplified descriptions of techniques for use by community groups to evaluate prospects for small hydro development are given. The pre-feasibility or reconnaissance stage is presented in a step-by-step form. Feasibility studies, licensing and financing procedures are outlined with guidelines identified.

PB80-106669 PC **A04**/MF **A01**
Little (Arthur D.), Inc., Cambridge, MA.
Feasibility Investigations of Growing and Characterizing Gallium Arsenide Crystals in Ribbon Form.
Final rept.,
J. B. Berkowitz. 4 Jan 78, 54p NSF/RA-780667
Grant NSF-GI-43093
See also report dated Sep 75, PB-248 852.

This report presents the results of a program to investigate the feasibility of growing gallium arsenide crystals in ribbon form. Crystals of GaAs, .05 mm thick and 10 mm long were propagated using a confined zone melting apparatus. To prevent loss of arsenic, a modification using boron oxide as a sealant was used successfully. Attempts at growing thin sheets of GaAs on single crystal sodium chloride substrates, via liquid phase epitaxy, were not successful; however, a combined VPE/LPE technique may hold some promise.

PNL-SA-7115 PC **A21**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Proceedings of the Ocean Thermal Energy Conversion (OTEC) Biofouling and Corrosion Symposium.
R. H. Gray. Aug 78, 478p CONF-771001-
Contract EY-76-C-06-1830
Conference on ocean thermal energy conversion-biofouling and corrosion problems, Seattle, WA, USA, 10 Oct 1977.

Separate abstracts were prepared for 39 of the 40 papers presented. One paper was previously included in the data base. (ERA citation 04:049666)

SAN-0113-T3 PC **A02**/MF **A01**
University of Southern California, Los Angeles. Dept. of Materials Science.
Low Cost Solar Cells Based on Amorphous Silicon Electrodeposited from Organic Solvents. Technical Quarterly Progress Report 2, December 1, 1978--February 28, 1979.
F. A. Kroeger. 1979, 5p
Contract EY-76-S-03-0113-040

Electrodeposition studies using three possible silicon sources are reported. Improvements of the apparatus for the cathodic deposition of a-Si with the exclusion of air are discussed. Experiments are described which attempt to characterize the structure of the deposits. These include mass spectroscopy and x-ray diffraction analysis. Work for the next quarter is previewed. (ERA citation 04:051248)

SAN-1331-T1 PC **A23**/MF **A01**
Acres American, Inc., Buffalo, NY.
Feasibility of Compressed Air Energy Storage as a Peak Shaving Technique in California. Consultant Report. Volume II.
Sep 78, 540p
Contract EY-76-C-03-1331

The purpose of the study was to identify the technical, economic, and siting feasibility, on a preliminary basis, of the use of compressed air energy storage in the State of California. The report is essentially organized according to these three major divisions of scope. The first seven sections are devoted to reporting the results of the siting feasibility study activities. The siting methodology, site search, and ranking of sites are discussed in Sections 1 through 5. Section 6 presents site documentation, and Section 7 summarizes the siting feasibility results. Additional site documentation and details of the ranking criteria are contained in Appendices A, B, and F. The economic feasibility of CAES in California is presented in Section 8. The analysis was performed on a parametric basis using gas turbines and combined cycle plants as a comparison. The methodology, base data, and results are presented in this section, and the computer program used is presented in Appendix E. The design sites for porous media and compensated hard rock are documented in Section 9, along with an alternate site for each type of plant. The results of the technical feasibility portion of the study, the plant designs for porous media and hard rock storage, are presented in Sections 10 and 11. Appendices C and D contain discussions of projected developments in gas turbine generators and CAES plant designs, as both technologies are expected to advance in the near term. Cost estimates and construction schedules have been prepared for the plant designs of Sections 10 and 11, and are presented in Section 12 and Appendix H. Section 13 summarizes the results and conclusions of the study, and the Recommendations are contained in Section 14. (ERA citation 04:048724)

SAND-78-1583C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
High Temperature Operation of Two-Junction Photovoltaic Converters.
K. W. Mitchell. 1978, 4p CONF-781210-1
Contract EY-76-C-04-0789
IEEE electron devices meeting, Washington, DC, USA, 4 Dec 1978.

Multijunction solar cells can have important application in combined photovoltaic/thermal systems. Over one-third of industrial process heat is used at temperatures below 400 exp 0 K. Optimized two-cell photovoltaic converters are predicted to have efficiencies up to 39 percent at 300 exp 0 K and up to 29 percent at 450 exp 0 K, thus maintaining high efficiencies at temperatures compatible with thermal applications. Operating the cells independently rather than in series provides no major gain in efficiency except where the cells would operate at different temperatures. (ERA citation 04:025904)

SAND-79-1588C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Central Receiver Test Facility Control and Data Systems.
D. B. Davis. 1979, 9p CONF-791005-1
Contract EY-76-C-04-0789
ISA national conference, Chicago, IL, USA, 22 Oct 1979.

The central Receiver test Facility (CRTF) is the primary solar test facility for the Department of Energy and is operated by Sandia Laboratories, Albuquerque, New Mexico. The multiple minicomputer control and data systems utilized in CRTF are described. (ERA citation 04:051271)

SAND-79-6000 PC **A03**/MF **A01**
Battelle-Geneva Research Centers (Switzerland).
Use of Solar Energy for the Production of Electricity in the Alps.
P. Newman. Jan 79, 48p
Contract EY-76-C-04-0789
C Serie de publications de la Commission federale de la conception globale de l'energie, Etude No. 7, October 1976.

Means of converting solar energy into electricity are briefly reviewed. Applications of solar energy technology to meet the increasing demand for electricity in Switzerland are considered. A description and discussion of central tower and heliostat field systems is presented. Details concerning steam cycles and solar boilers, turboalternator units and heat exhaust systems, daily and seasonal power variations of a solar plant, and effects on energy output due to cloudiness are considered. Meteorological data for the evaluation of possible solar generating sites is discussed and the solar potential of the Alps is analyzed. Integration of solar plants into the existing power grid is discussed. The economic and environmental impacts of solar power plants are considered in detail and a development program is suggested. (ERA citation 04:048320)

SERI/TP-51-314 PC **A02**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Photovoltaic Markets: A Review and Assessment.
D. M. Posner. Jun 79, 6p CONF-790541-46
Contract EG-77-C-01-4042
International Solar Energy Society meeting, Atlanta, GA, USA, 28 May 1979.

Available information on potential markets for photovoltaic power systems is reviewed. A set of key parameters which affect the rate of photovoltaic market penetration is used to develop a simple analytical structure that characterizes potential markets. Completed studies on photovoltaic markets were reviewed to describe potential markets using this structure. Selected markets were then examined in greater detail in a market demand workshop attended by potential purchasers in these markets. Available information, while sufficient to provide a rudimentary indication of how markets might develop, does not allow the construction of any single market scenario in which a high level of confidence can be placed. Major uncertainties in the available information on photovoltaic markets are highlighted. (ERA citation 04:051258)

TID-28839 PC **A04**/MF **A01**
Department of Energy, Washington, DC.
Commercialization Strategy Report for Advanced Electric Generation Technologies.
1978, 75p

Advanced technologies for electric generation have the potential for making a significant impact by the 1990s. The principal contenders are: atmospheric fluidized-bed combustion, fuel cells, and combined cycle with integrated coal gasifier. Technical, market/economic, environmental, institutional readiness aspects and benefits analysis for each of the candidate technologies are presented. (ERA citation 04:051826)

TID-28853 PC **A04**/MF **A01**
Department of Energy, Washington, DC.
Commercialization Strategy Report for Cogeneration.
1978, 75p

The commercial readiness assessment for cogeneration is discussed. Technical, market/economic, environmental, and institutional readiness aspects

are covered. Benefits analysis is presented. The commercialization strategy for cogeneration is covered by discussing commercialization profile and recommended commercialization approach. The principal technologies currently available for cogeneration include extraction steam turbine-generator, gas turbine system with waste heat boiler; and diesel with waste heat recovery. (ERA citation 04:051792)

UCRL-83011 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Using Surface Waters for Supplementing Injection at the Salton Sea Geothermal Field (SSGF), Southern California.
E. Raber, L. B. Owen, and J. E. Harrar. 10 Jul 79, 5p CONF-790906-15
Contract W-7405-ENG-48
Geothermal Resources Council annual meeting, Reno, NV, USA, 24 Sep 1979.

The flash-steam conversion cycle is most suitable for electric power production at the SSGF. However, large-scale development of the SSGF may require use of makeup water supplements to injected brine for a viable reservoir pressure maintenance program. Since steam condensate will probably be required to satisfy power plant cooling needs, local surface waters have been evaluated for their potential use as sources of injection makeup. It was found that direct injection of untreated makeup water is not feasible because of high suspended solids loading and potential incompatability problems. However, mixtures of ambient temperature makeup water and higher temperature (80 to 90 exp 0 C) brine effluent, in a 1:4 mass ratio, are potentially injectable following processing by reaction clarification and granular media filtration. (ERA citation 04:051374)

10C. Energy Storage

AD-A075 633/8 Not available NTIS
Defence Research Establishment Ottawa (Ontario)
Nickel/Cadmium Batteries in Aircraft Engine Starting.
K. Feldman , R. L. Haines , and W. A. LePage. 1974, 4p Rept no. DREO-699
Availability: Pub. in Annual Proceedings Power Sources Conference (26th), May 74 (No copies furnished by DTIC).

No abstract available.

AD-A075 651/0 Not available NTIS
Defence Research Establishment Ottawa (Ontario)
Electrochemical Energy Storage Systems: A Small Scale Application to Isolated Communities in the Canadian Arctic,
W. A. Adams, C. L. Gardner, and E. J. Casey. 1979, 7p Rept no. DREO-807
Availability: Pub. in Canadian Electrical Engineering Jnl., v4 n3 p4-10 1979 (No copies furnished by DTIC).

No abstract available.

AD-A075 835/9 PC **A07**/MF **A01**
Kdi Score Inc Cockeysville MD
Improved Thermal Battery.
Final rept. Jun 76-Dec 78,
Praful V. Dand , and Khushrow K. Press. Apr 79, 134p AFAPL-TR-79-2027
Contract F33615-76-C-2144

Under U.S.A.F. Contract F33615-76-C-2144, KDI SCORE undertook a study to advance state-of-the-art technology of thermal batteries for military applications, so that they might meet the requirements of some systems now using more complicated and expensive reserve batteries. An exhaustive study of the calcium/calcium chromate system and investigation of many new electrochemical systems showed lithium-aluminum/iron disulfide to be a superior system for thermal batteries, with longer life at high current densities, and greater energy density. Based on battery tests, it was concluded that calcium/calcium chromate thermal batteries could not achieve the goal of 30 minute's life at 30 volts and 30 amperes, and that the lithium-aluminum/iron disulfide system, which achieved approximately 80% of the goal, could, with further development, reach and possibly surpass this goal. (Author)

AD-A076 231/0 Not available NTIS
Defence Research Establishment Ottawa (Ontario)
Primary Batteries Session: Lead Chloride Cathodes for Seawater Batteries,
G. J. Donaldson , J. R. Coleman , T. J. Gray , and J. Wojtowicz. 1976, 5p Rept no. DREO-740
Availability: Pub. in Annual Proceedings Power Sources Conference (27th), 4p Jun 76 (No copies furnished by DTIC).

No abstract available.

ANL-79-39 PC **A08**/MF **A01**
Argonne National Lab., IL.
High-Performance Batteries for Electric-Vehicle Propulsion and Stationary Energy Storage. Progress Report, October 1978-March 1979.
May 79, 151p
Contract W-31-109-ENG-38

This report covers the research, development, and management activities of the programs at Argonne National Laboratory (ANL) and at subcontractors' laboratories on high-temperature batteries during the period October 1978 to March 1979. These batteries are being developed for electric-vehicle propulsion and for stationary energy-storage applications. The present cells, which operate at 400 to 500 exp 0 C, are of a vertically oriented, prismatic design with one or more inner positive electrodes of FeS or FeS sub 2 , facing electrodes of lithium-aluminum alloy, and molten LiCl-KCl electrolyte. During this six-month period, cell and battery development work continued at ANL, Eagle-Picher Industries, Inc., Gould Inc., and the Energy Systems Group of Rockwell International. Fabrication of a 40-kWh battery by Eagle-Picher for testing in an electric van is nearing completion. Cost and design studies for a Mark II electric-vehicle battery, which will have somewhat higher performance and use potentially low-cost materials and fabrication methods, were conducted by all three subcontractors, and contracts are being negotiated for development of Mark II batteries. Conceptual design studies continued at Rockwell International on a 100 MWh stationary energy-storage module. The present plan is to construct a module based on these designs for testing at the BEST (Battery Energy Storage Test) Facility. Work was also in progress at the Carborundum Co., General Motors Research Laboratories, and various other organizations on developing materials and components for cells. 38 figures, 28 tables. (ERA citation 04:053257)

ANL-79-64 PC **A03**/MF **A01**
Argonne National Lab., IL.
Development of Lithium/Metal Sulfide Batteries at Argonne National Laboratory: Summary Report for 1978.
P. A. Nelson, D. L. Barney, and R. K. Steunenberg. Jul 79, 42p
Contract W-31-109-ENG-38

This report consists of highlights for 1978 of Argonne National Laboratory's program on the development of lithium/metal sulfide batteries. These batteries are being developed for electric-vehicle propulsion and for stationary energy-storage applications. The present cells, which operate at 400 to 450 exp 0 C, are of a vertically oriented, prismatic design with one or more inner positive electrodes of FeS or FeS sub 2 , facing electrodes of lithium-aluminum alloy, and molten LiCl-KCl electrolyte. During 1978, cell and battery development work continued at ANL, Eagle-Picher Industries, Inc., Gould, Inc., and the Energy Systems Group of Rockwell International. Fabrication of a 40-kWh battery by Eagle-Picher for testing in an electric van is nearing completion. Cost and design studies for a Mark II electric-vehicle battery, which will have somewhat higher performance and use potentially low-cost materials and fabrication methods, were conducted by all three subcontractors, and contracts are being negotiated for development of Mark II batteries. Conceptual design studies continued at Rockwell International on a 100-MWh stationary energy-storage module. The present plan is to construct a module based on these designs for testing at the BEST (Battery Energy Storage Test) Facility. Work was also in progress at the Carborundum Co., General Motors Research Laboratories, and various other organizations on developing materials and components for cells. 9 figures, 7 tables. (ERA citation 04:055027)

CONF-790538-16 PC **A02**/MF **A01**
Argonne National Lab., IL.
Overview of Basic and Applied Research on Battery Systems at Argonne.
M. V. Nevitt. 1979, 10p
Contract W-31-109-ENG-38
Fast ion transport in solids-electrode and electrolytes conference, Lake Geneva, WI, USA, 21 May 1979.

The need for a basic understanding of the ion transport and related effects that are observed under the unique physical and electrochemical conditions occurring in high-temperature, high-performance batteries is pointed out. Such effects include those that are typical of transport in bulk materials such as liquid and solid electrolytes and the less well understood effects observed in migration in and across the interfacial zones existing around electrodes. The basic and applied studies at Argonne National Laboratory, centered in part around the development of a Li(alloy)/iron sulfide battery system for energy storage, are briefly described as an example of the way that such an understanding is being sought by coordinated interdisciplinary research. 3 figures. (ERA citation 04:055028)

CONF-790803-49 PC **A02**/MF **A01**
Argonne National Lab., IL.
Battery Engineering Problems in Designing an Electrical Load Leveling Plant for Lithium/Iron-Sulfide Cells.
S. M. Zivi, I. Pollack, H. Kacinskas, A. A. Chilenskas, and D. L. Barney. 1979, 5p
Contract W-31-109-ENG-38
14. intersociety energy conversion conference, Boston, MA, USA, 5 Aug 1979.

The design of a lithium/iron sulfide battery for utility load leveling is strongly dependent on the energy capacity selected for the cells. Battery hardware costs are minimized by the selection of large cells, with 30-kWh cells being the largest that would be consistent with system constraints in a 100-MWh load leveling plant. However, it is anticipated that such large cells may be precluded by system reliability and maintainability considerations, and cell capacities on the order of 1 kWh may be needed to satisfy those requirements. Large cells can be protected against overcharge by electronically controlled charge equalization systems that have been developed for experimental eV batteries. The economics of electronically controlled equalization becomes unfavorable for small load-leveling cells; and if small cells are selected, it will be necessary to develop inherent protective means within each cell, with respect to overcharge. (ERA citation 04:055029)

EPRI-EM-1059 PC **A12**/MF **A01**
Gould, Inc., Rolling Meadows, IL. Gould Labs.
Assessment of Technical and Economic Feasibility of Zinc/Bromine Batteries for Utility Load Leveling. Final Report.
R. A. Putt. May 79, 256p

This feasibility study was undertaken to determine the viability of zinc/bromine batteries for utility load-leveling applications. Gould's preliminary comparisons of bromine and chlorine as positive reactants in flowing electrolyte cells led to promising proposals for storing bromine, minimizing self-discharge, controlling zinc dendrites, and developing a cost-effective cell design. These were major shortcomings discovered in previous work by other investigators. Principal accomplishments in this 30-month contract, which included substantial funding by Gould as a program sharing partner, were the following: selecting an organic complexing agent that lowers the free aqueous phase bromine activity, that is stable in the cell environment and that does not present toxicological hazards; selecting a flowing electrolyte system with separate negative and positive solutions stored externally to the cell stack; selecting titanium electrodes, a planar sheet for the zinc negative and porous flow-thru structure for the bromine positive;

selecting a micro-porous separator that is inexpensive, commercially available, and performance-proven in lead--acid batteries; identifying conditions for uniform, adherent, nondendritic zinc plating in excess of 200 mAh/cm exp 2 ; building and cycling cells and batteries in successive scaleups from 3 Wh to 1.28 kWh that demonstrated the feasibility of meeting utility load-leveling performance requirements, and that uncovered no life-limiting features of the zinc/bromine system; and iteratively developing cost and design studies of a 400-kWh module building block for a 100-MWh load-leveling plant that showed reasonable promise of meeting all technical and economic constraints for this application. 95 figures, 37 tables. (ERA citation 04:051757)

PATENT-4 158 084 PC **A02**/MF **A01**
Department of the Navy Washington DC
Heat Sources for Thermal Batteries: Exothermic Intermetallic Reactions.
Patent,
Jack L. Prentice. Filed 18 Feb 77, patented 12 Jun 79, 5p AD-D006 429/5, PAT-APPL-770 246 Supersedes PAT-APPL-770 246-77.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An intimate mixture of two or more finely divided metals is formed into a heat pad or pellet for a thermal battery. The metals are chosen to react exothermically in a self-sustaining manner to provide a heat source for the battery whereby the battery electrolyte, normally a solid, is melted and the battery generates current. (Author)

PB80-802309 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Silver Cells. Volume 1. 1964-1976 (Citations from the NTIS Data Base).
Rept. for 1964-76,
Diane M. Cavagnaro. Dec 79, 214p
For the companion Published Search of the Engineering Index Data Base, see PB80-802325.

This bibliography cites Federally-funded research reports on silver cell primary and storage batteries with respect to electrochemistry, separators, hermetic seals, electrolytes, electrodes, charging, reliability, and applications. The citations pertain mainly to silver zinc cells and to silver cadmium cells. (This updated bibliography contains 207 abstracts, none of which are new entries to the previous edition.)

PB80-802317 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Silver Cells. Volume 2. 1977-November, 1979 (Citations from the NTIS Data Base).
Rept. for 1964-Nov 79,
Diane M. Cavagnaro. Dec 79, 101p
Supersedes NTIS/PS-78/1191, NTIS/PS-77/1026, NTIS/PS-76/0879, and NTIS/PS-75/649. For the companion Published Search of the Engineering Index Data Base, see PB80-802325. See also Volume 1, 1964-1976, PB80-802309.

The cited reports from Federally-funded research relate to silver cell primary and storage batteries with respect to electrochemistry, separators, hermetic seals, electrolytes, electrodes, charging, reliability, and applications. Studies concerning silver zinc cells and silver cadmium cells are discussed in the majority of the abstracts. (This updated bibliography contains 95 abstracts, 19 of which are new entries to the previous edition.)

PB80-802325 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Silver Cells (Citations from the Engineering Index Data Base).
Rept. for 1970-Nov 79,
Diane M. Cavagnaro. Dec 79, 130p
Supersedes NTIS/PS-78/1192, NTIS/PS-77/1027, and NTIS/PS-76/0880. For the companion Published Search of the NTIS Data Base, see PB80-802309 and PB80-802317.

Citations from worldwide research on silver cell primary, storage, and solid state batteries are included in this compilation. Studies on electrochemistry, electrodes, electrolytes, separators, reliability, charging, and performance are covered. The use of these batteries in spacecraft, electric automobiles, and submersibles is discussed. (This updated bibliography contains 124 abstracts, 20 of which are new entries to the previous edition.)

SAND-79-1428C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Batteries for Specific Solar Applications.
R. P. Clark. 17 Jul 79, 24p
Contract EY-76-C-04-0789

Reproductions of slides used in an oral presentation are published. Thermal batteries are mentioned, and the program strategy for developing batteries for photovoltaic systems is outlined. (ERA citation 04:049646)

SAND-79-1504C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Mechanical Energy Storage Technology Development.
R. O. Woods. 1979, 16p
Contract EY-76-C-04-0789

The project goals include the selection of those mechanical components of flywheel energy storage systems that can be carried to their next stage of evolution by efforts within the scope of the budget; the funding of developmental work treating such components; and the documentation of the state-of-the-art in component technology where such information is scattered or fragmentary. Efforts have treated the followed components: rolling contact bearings; magnetic bearings; composite wheels; composite materials; and seals. Funding has been provided to other agencies for the testing of energy storage systems, and the groundwork has been completed for a program to deal with the problems of vacuum technology. (ERA citation 04:051750)

SAND-79-1669C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Recent Spin Tests of Two Composite Wagon Wheel Flywheels.
A. K. Miller. 1979, 12p
Contract EY-76-C-04-0789

The paper briefly discusses some observations made of spin tests performed on two variations on the Sandia wagon wheel flywheel. In one design, the graphite/epoxy rim was attached to the aluminum hub with twenty-four thin Keviar-49/epoxy spokes, while in the other design eight thicker graphite/epoxy spokes connected the rim to the hub. The test objective was to compare the dynamic behavior of the two structurally dissimilar flywheels. The tests were limited to speeds less than 22,000 RPM and only moderate torques were applied during the acceleration phase of the tests in an attempt to detect speeds for previously predicted modes of vibration of the flywheel-spin-turbine system. Using proximity sensors, horizontal disturbances of the flywheel hub were detected for speeds less than approxiately 6,000 RPM. These disturbances are believed to be associated with predicted modes of vibration for the flywheel-spin-turbine system. No modes of vibration were sensed for the predicted possible whirl and torsional resonances in the speed range between 6,000 RPM and 22,000 RPM. A squeeze film damper assembly which was attached to the flywheel spindle shaft is believed to have sufficently dampened possible whirl modes so that they were undetectable in the speed range tested. The tests indicated that the squeeze film damper assembly successfully stabilized the flywheel-spin-turbine system when the damper functioned properly; however, low frequency retroograde instabilities were induced into the system by the damper assembly when it was not operated within prescribed parameters. (ERA citation 04:051752)

STUDSVIK/E-1-79/60 PC **A03**/MF **A01**
Studsvik Energiteknik AB, Nykoping (Sweden).
Development and Testing of Materials for Large Hot-Water Reservoirs.
J. Bergman. 7 Mar 79, 41p
In Swedish.
U.S. Sales Only.

The storage of hot water in large reservoirs makes it possible to utilize waste heat and solar energy as energy sources much more efficiently. Different materials suitable as top coats, insulation materials and diffusion barriers in such a construction were studied. The life-times of tubes made of these materials being in contact with hot water at temperatures of 70 exp 0 , 80 exp 0 and 95 exp 0 C were examined. (ERA citation 04:051755)

STUDSVIK/ET-78/8 PC **A02**/MF **A01**
Studsvik Energiteknik AB, Nykoping (Sweden).
Heat Storage in Rocks: Description of a Project.
R. Roseen, and T. Agerstrand. 29 Sep 78, 12p
In Swedish.
U.S. Sales Only.

The aim of the project described is to develop a method for heat storage which is applicable for the heating of houses both in urban and rural areas where rigid bedrock exists. In a borehole having a depth of 100 to 150 m a casing tube is installed. The tube is closed at the bottom and is connected with a circulation system to a heat pump in the apartment which is going to be heated. Such a facility is going to be constructed and tested at Studsvik, Sweden. The results obtained with this arrangement will be used to evaluate the usefulness of this technique for heat storage in Sweden. (ERA citation 04:051756)

UCRL-83030 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Vehicular Applications of Mechanical Energy Storage--FY79.
W. T. Crothers. 25 Jul 79, 9p
Contract W-7405-ENG-48

The goals of this project are to develop and evaluate mechanical-energy storage technology for application to electric, hybrid, and heat-engine vehicles and to maximize the commercial potential of the technology. Four studies were completed in FY79. Performance improvement related to mechanical-energy storage was the subject of two reports. Continuously variable transmission design was discussed in a third. Elastomeric braking was evaluated in a fourth. Two flywheel/electric systems were fabricated and partially tested. An elastomer-braking system design was initiated. Criteria for a vehicle powered by a flywheel/heat engine were formulated. (ERA citation 04:050293)

11. MATERIALS

11A. Adhesives and Seals

AD-A076 004/1 PC **A03**/MF **A01**
Bloomingdale Rubber Co Chester Pa
Improved Structural Adhesives for Bonding Metals.
Technical rept. 1 Apr 51-1 Apr 52,
H. C. Engel. Dec 52, 40p WADC-TR-52-156
Contract AF 33(038)-21669

Work under USAF Contract No. AF 33(038)-21669 has been directed toward the development of an improved structural adhesive for boding metals. An adhesive designated as PA-101, developed and tested under this contract, meets most of the research objectives and so far as is now known conforms to the requirements of Specification 14164. The PA-101 formulation has been evaluated as a two-part, liquid adhesive. (Author)

AD-A076 308/6 PC **A03**/MF **A01**
David W Taylor Naval Ship Research and Development Center Bethesda Md
Ice Seal for Rotating Shafts.
Research and DEVELopment rept.,
Alfred B. Harbage, Jr. Oct 79, 35p Rept no. DTNSRDC-79/085

A sealing device utilizing water ice to form a very close-fitting liquid water capillary seal about a rotating shaft has been designed, built, and tested. The experimental shaft diameter was 6 in. (15.24 cm) and it rotated at 600 rpm. The observed leakage rates were below 0.05 cu in/sec (0.8 cu cm/s) for differential pressures up to 600 psi (4150 kPa). The maximum power required to drive the shaft was less than 500 W. A set of basic equations was developed to predict the seal performance. Experi-

mental results indicate the basic equations are sufficiently accurate for future seal designs. (Author)

PATENT-3 233 862 Not available NTIS
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
Fluid Pressure Balanced Seal.
Patent,
H. W. Marsh. Filed 3 Oct 61, patented 8 Feb 66, 7p N79-33469/4, PAT-APPL-142 583
Supersedes PAT-APPL-142 583. Subm-Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

A seal which increases in effectiveness with increasing pressure is presented. The seal's functional capability throughout both static and dynamic operation makes it particularly useful for sealing ball valve ports. Other features of the seal include the ability to seal two opposed surfaces simultaneously, tolerance of small misalignments, tolerance of wide temperature ranges, ability to maintain positive sealing contact under conditions of internal or external pressurization, and ability to conform to slight irregularities in seal or surface contours.

PATENT-4 142 868
Not available NTIS
Department of Energy, Washington, DC.
Wear Compensating Seal Means for Rotary Piston Coal Feeder.
Patent,
H. T. Gencsoy, and J. F. Gardner. Filed 2 May 78, patented 6 Mar 79, 8p PAT-APPL-902 181
Supersedes PAT-APPL-902 181-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

The present invention is directed to a wear compensating seal arrangement for use in a rotary piston feeder utilized for feeding pulverized coal into a gasifier operating at relatively high pressures and elevated temperatures. The rotary piston feeder has a circular casing with a coal loading opening therein diametrically opposed from a coal discharge and contains a rotatable disoidal rotor having a cylinder in which a reciprocatable piston is disposed. The reciprocation of the piston within the cylinder is provided by a stationary conjugate cam whereby pulverized coal from a coal hopper at atmospheric pressure can be introduced into the cylinder and then discharged therefrom into the high pressure gasifier while maintaining minimal losses of producer gas and the expenditure of minimal energy which would detract from the efficiency of the gasification. The seal arrangement of the present invention is disposed between the rotor and the casing about the coal discharge and prevents the high pressure gases from within the gasifier from escaping between these relatively movable parts during operation of the coal feeder. The seal utilizes a primary seal in contact with the rotor and a secondary seal supporting the primary seal. The primary seal is continuously urged towards the rotor by springs and the high pressure producer gas. (ERA citation 04:052462)

PB80-801855 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Adhesives: Properties, Preparation, and Applications. Volume 2. 1976-November, 1979 (A Bibliography with Abstracts).
Rept. for 1976-Nov 79,
Diane M. Cavagnaro. Dec 79, 302p
Supersedes NTIS/PS-78/1180, NTIS/PS-77/1060, NTIS/PS-76/0892, NTIS/PS-75/704, and NTIS/PS-75/040. See also Volume 1, 1970-1975, NTIS/PS-77/1059.

Studies on polymer chemistry, curing, crosslinking, and synthesis for use as adhesives are cited. The heat resistance, fracture, aging, shear strength, and other physical and mechanical properties of adhesives and sealants are covered, as is the use of adhesives in aircraft, laminates, wood bonding, electronics, and spacecraft. (This updated bibliography contains 296 abstracts, 95 of which are new entries to the previous edition.)

PB80-802010 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Seals and Gaskets. Volume 2. November, 1976-November, 1979 (A Bibliography with Abstracts).
Rept. for Nov 76-Nov 79,
William E. Reed. Dec 79, 221p
Supersedes NTIS/PS-78/1251, NTIS/PS-77/1093, NTIS/PS-76/0938, NTIS/PS-75/838, and NTIS/PS-75/140. See also Volume 1, 1970-October, 1976, NTIS/PS-77/1092.

The citations cover both gas and liquid seals. Studies include polymers, physical properties, glass metal seals, configurations, test methods, and design. Applications involve such areas as gas turbines, water pumps, shaft seals, spacecraft seals, and other specialized seals and gaskets. Highway joint seals have been excluded. (This updated bibliography contains 213 abstracts, 74 of which are new entries to the previous edition.)

11B. Ceramics, Refractories, and Glasses

AD-A075 639/5 Not available NTIS
Martin Marietta Labs Baltimore Md
Trimethylsilylation as a Tool for the Study of Cement Pastes (2) Quantitative Analysis of the Silicate Fraction of Portland Cement Pastes,
E. E. Lachowski. 22 Feb 79, 6p ARO-15771.2-MS
Contract daag29-78-C-0041
Availability: Pub. in Cement and Concrete Research, v9 n3 p337-342 1979 (No copies furnished by DTIC).

No abstract available.

AD-A075 882/1 PC **A03**/MF **A01**
New Jersey Ceramic Research Station New Brunswick
Titanium Nitride Cermets.
Technical rept.,
Frederick K. Davey , Ernest R. Glabau , and G. Edwin Lorey. Jul 52, 35p WADC-TR-52-155
Contract W-33-038-ac-15800

Several compositions of cermets based on titanium nitride were investigated. The cermets were tested for strength in cross bending, resistance to oxidation, and resistance to thermal shock. The differences of the various compositions are noted as well as the effect of different processing techniques. Titanium nitride cermets containing chromium as the metal phase were found to have the best properties of the compositions investigated. (Author)

AD-A075 888/8 PC **A03**/MF **A01**
Illinois Univ At Urbana-Champaign Engineering Experiment Station
Metal Bonded Titanium Diboride.
Technical rept.,
James A. Nelson , Tracy A. Willmore , and Dwight G. Bennett. Mar 52, 39p 61, WADC-TR-52-111
Contract W-33-038-ac-14520

Titanium diboride in a finely divided state was combined with thirty percent (by weight) of either powdered iron, cobalt, nickel, chromium, or zirconium and pressed into compacts which were fired in an argon atmosphere at temperatures exceeding the melting point of the added metal. The sintering characteristics of the compacts and the phases present after firing are described. Tests were made for oxidation resistance at 2000 F. The information obtained from this investigation is discussed with a view towards further work regarding the possibilities of using metal bonded titanium diboride in high temperature applications for flight propulsion units. (AUthor)

AD-A075 984/5 PC **A02**/MF **A01**
Ohio State Univ Research Foundation Columbus
Exploratory Study of the Metal Bonding of Cordierite and Stupalith.
Technical rept.,
Margaret Pausewang , and Earle T. Montgomery. Jul 52, 9p WADC-TR-52-189
Contract AF 33(616)-3

An attempt was made to produce a useful cermet solid body having as the ceramic component a material with a very low coefficient of expansion and as the metal component a metal with a melting point above the operating temperature of a gas-turbine engine. Due to the low melting temperatures of the two ceramic materials investigated, wetting of the components was not achieved and consequently a cermet body did not result. (Author)

AD-A076 023/1 PC **A07**/MF **A01**
TRW Inc Cleveland Ohio
Ultrasonic Detection of Surface Flaws in Gas Turbine Ceramics.
Final technaical rept. 13 Sep 77-12 Dec 78,
Thomas Derkacs , and Istvan M. Matay. Aug 79, 137p TRW-ER-7980-F, NADC-76369-30
Contract N62269-77-C-0136

A 45 MHz ultrasonic surface wave technique was developed and evaluated for detection of small surface flaws of $<$ 100 microns (0.004 inches) in gas turbine quality ceramics. The surface wave technique, which employs conventional immersion C-scan recording, was evaluated on hot pressed silicon nitride and silicon carbide of two sources each, and also on reaction bonded silicon nitride and sintered silicon carbide. These evaluations included tests on specimens run in a burner rig to simulate the effects on NDE of a gas turbine operating environment. Conventional mechanical tests were also run to verify defect sizes and types and to correlate flexural strength with ultrasonic inspection results. The technique was found to be quite sensitive to surface conditions such as grinding damage, as well as to defects. Flexural strength was correlated qualitatively with the extent of ultrasonic response from machining damage. The sensitivity to defects was found to be limited by the depth of machining damage and the focal spot size of the ultrasonic beam. For the 580 microns (0.023 inch) diameter focal spot size used, the smallest defect verified metallurgically was equivalent to a 30 microns (0.0012 inch) deep semi-circular crack. Specimens run in the burner rig were found to become uninspectable because of fused silica on the surface. (Author)

AD-A076 036/3 PC **A02**/MF **A01**
Massachusetts Inst of Tech Cambridge
Titanium Carbide-Nickel Cermets: Processing and Joing.
Technical rept.,
John Wulff , James E. Cline , Amos J. Shaler , Malcolm Basche , and Romeo G. Bourdeau. Mar 52, 20p WADC-TR-52-103
Contract AF 33(038)-8879

Titanium carbide-nickel cermets can be sintered to have transverse rupture strengths over 250,000 pounds per square inch. To do so, four principal processing variables must be controlled: the powder must be as free as possible from oxygen and nitrogen; the powder must be milled in carbon tetrachloride and pressed without intermediate drying; sintering must be done in vacuo or possibly in an inert gas, but not in hydrogen; heating-up must be slow enough to allow thorough degassing. Joining titanium-carbide cermets to high-temperature alloys has been accomplished by vacuum diffusion, and gives a weld stronger than thee cermet. Fabrication of cermet articles of graded composition has been successfully accomplished by fragmentation-forming, i.e., cold forging the powder in a ductile envelope and subsequently sintering (Author)

AD-A076 151/0 PC **A04**/MF **A01**
Avco Systems Div Wilmington Ma
Improving the Stress Rupture and Creep of Silicon Nitride.
Final rept.,
Thomas T. Vasilos , Rowland M. Cannon, Jr. , and B. J. Wuensch. 30 Mar 79, 70p NASA-CR-159585
Contract NAS-3-20088

Yttria-stabilized zirconium oxide (Zyttrite) additions to purified silicon nitride were found to improve the high temperature strength, stress rupture and creep properties of hot pressed samples very markedly. Room temperature bend strengths, however, of four compositions evaluated were each about one-third lower that Norton Company's NC-

132 silicon nitride composition. This difference decreased with increasing temperature until at 1200 C, there was reasonable equivalence between most of the zyttrite containing compositions and NC-132 in terms of short time bend strength measurements. At 1370 C, the 10 and 20 wt. % containing zyttrite compositions showed bend strengths as much as double the NC-132 material. Bend stress rupture fesults for 10 and 20 wt. % zyttrite containing compositions showed a strong stress sensitivity at the 276 MN/m2 (40 Kpsi) level above 1200 C. Creep in bending measurements showed that at 1370 C and 1450 C, zyttrite containing compositions exhibited creep rates that were about 2 orders of magnitude lower that NC-132 material samples. All compositions appeared to follow deformation kinetics related to a viscoelastic mechanism, i.e., glassy phase diffusional creep or grain boundary sliding. (Author)

AD-A076 281/5 PC **A03**/MF **A01**
Stanford Univ Calif Center for Materials Research
Preparation and Characterization of Single Crystals and Epitaxial Layers of Silicon Carbide by Molten Salt Electrolysis.
Annual technical rept. 15 Jul 78-14 Jul 79,
T. H. Geballe , R. S. Feigelson , and D. Elwell.
Oct 79, 27p Rept no. CMR-243-026-001
Contract N00014-78-C-0489

The synthesis of silicon carbide by electrolysis of molten salts has been achieved for the first time. Two systems have been investigated, one involving K2SiF6 and Li2CO3 dissolved in a KF/LiF eutectic, the other being a combination of Na2CO3 and SiO2 with NaBO3 and LiF. The latter system has given much more reproducible results. In both cases, electrolysis has proceeded at about 750 C which is very low in comparison with the melting point of silicon carbide. Synthesis of SiC at temperatures below 1000 C does not appear to have been previously reported. Possibly because of the low deposition temperature, it has been found necessary to use deposition potentials which are appreciably highter than the minimum value. This use of relatively high deposition potentials and corresponding current densities leads to irregular growth morphology and to deposition of metastable 2H and 33R polytypes rather than the stable 6H or 15R. The SiC is co-deposited with an excess of amorphous carbon. Changes in melt composition to reduce the carbonate to silicate ratio are necessary to eliminate this excess. Initial deposits are relatively impure, the major contaminants being constituents of the inconel furnace lining.

CONF-790682-1 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Magnesium Oxide Enhancement of Sintering of Alumina.
C. S. Morgan, and V. J. Tennery. 1979, 10p
Contract W-7405-ENG-26
International conference on sintering and related phenomena, Notre Dame, IN, USA, 18 Jun 1979.

It is known that small quantites of MgO enhance sintering of Al sub 2 O sub 3 , the process of enhancement has not been established. Sintering data for compacts of several oxides heated at various rates to a specific temperaure show that the final density achieved in powder compacts is relatively insensitive to heating rates above about 2 exp 0 C/s. Transmission electron microscopy studies of these compacts show evidence of dislocation generation in the sintering material in regions between adjacent particles. Sintering measurements of compacts of Al sub 2 O sub 3 and MgO doped Al sub 2 O sub 3 show that MgO contributes to the initial densification even when high heating rates are applied to the compacts. Comparison of the observed densification kinetics with those of a diffusion process shows that the experimental results are incompatible with a diffusion controlled process. It is proposed that MgO on the surface of Al sub 2 O sub 3 particles increases the ease of dislocation motion and generation compared to pure Al sub 2 O sub 3 . This enhancement improves the compact densification. (ERA citation 04:048943)

COO-4451-2 PC **A04**/MF **A01**
Utah Univ., Salt Lake City. Dept. of Materials Science and Engineering.
Electrolytic Degradation of Lithia-Stabilized beta "-Alumina. Technical Progress Report, May 1, 1978--March 31, 1979.
A. V. Virkar. Apr 79, 71p
Contract EG-77-S-02-4451

Research activities are described concerning fabrication of beta " alumina specimens in the bar and tube geometries; construction and opertion of Na--beta " cells and the effect of cell temperature on the degradation of beta " alumina, cell design and role of impurities in beta "-alumina-(NaNO sub 3 -- NaNO sub 2) cell; effect of grain size on degradation; effect of K on degradation and fracture studies. It has been found that degradation of Na--Na cells is just above and below the melting point of Na, wetting is important, and fine grained ceramics degrade easier. (ERA citation 04:051992)

DOE/JPL-1060-23 PC **A02**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Performance Prediction Evaluation of Ceramic Materials in Point-Focusing Solar Receivers.
J. Ewing, and J. Zwissler. 1 Jun 79, 5p
Contract EX-77-A-29-1060

A Performance Prediction Model was adapted to evaluate the use of ceramic materials in solar receivers for point-focusing distributed applications. TPS system requirements were determined including the receiver operating environment (such as concentrator performance and environment/natural occurrences) and system operating parameters for various engine types. Preliminary receiver designs evolve from these system requirements. Specific receiver designs evaluated in this report to determine material functional requirements include the NRL solchem converter/heat exchanger, MIT/LL ceramic dome. Black and Veatch/EPRI ceramic tube receiver, and the Sanders honeycomb matrix Brayton receiver. Status of the first phase of a continuing task of evaluation and reporting on high temperature ceramics for solar thermal receiver applications is described. Subsequent reports will develop the Performance Prediction Model in more detail and provide data on its use in the several high temperature receiver and reactor designs planned for or under development. (ERA citation 04:054393)

DOE/JPL-1060-24 PC **A05**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Evaluation of Cellular Glasses for Solar Mirror Panel Applications.
M. Giovan, and M. Adams. 15 Jun 79, 96p
Contract EX-76-A-29-1060

An analytic technique is developed to compare the structural and environmental performance of various materials considered for backing of second surface glass solar mirrors. Metals, ceramics, dense molded plastics, foamed plastics, forest products and plastic laminates are surveyed. Cellular glass is determined to be a prime candidate due to its low cost, high stiffness-to-weight ratio, thermal expansion match to mirror glass, evident minimal environmental impact and chemical and dimensional stability under conditions of use. While applications could employ this material as a foam core or compressive member of a composite material system, the present analysis addresses the bulk material only, allowing a basis for simple extrapolations. The current state of the art and anticipated developments in cellular glass technology are discussed. Material properties are correlated to design requirements using a Weibull weakest link statistical method appropriate for describing the behavior of such brittle materials. A mathematical model is presented which suggests a design approach which allows minimization of life cycle cost; given adequate information for a specific aplication, this would permit high confidence estimates of the cost/performance factor. A mechanical and environmental testing program is outlined, designed to providea material property basis for development of cellular glass hardware, together with methodology for collecting lifetime predictive data required by the mathematical treatment provided herein. Preliminary material property data from measurements is given. (ERA citation 04:054387)

EPRI-FP-1060 PC **A05**/MF **A01**
Henry Krumb School of Mines, New York.
Fatigue and Creep Behavior of Si sub 3 N sub 4 and SiC for Gas Turbine Applications. Final Report.
J. K. Tien, R. M. Arons, and L. Roth. May 79, 95p

Improvement of materials to resist the aggressive environments in advanced power generation systems includes the use of ceramics in tensile load-bearing applications. Of immediate concern is the paucity of data, even phenomenological in nature, upon which to base preliminary mechanical design considerations. This project inspects two important material characteristics - time-dependent deformation and fracture (creep) and response to cyclic loading (fatigue). Not pressed silicon carbide (SiC) and silicon nitride (Si sub 3 N sub 4) were chosen for this study because they are the most promising ceramic materials for power equipment use. Creep characteristics were assessed in uniaxial tensile lading and fatigue properties were determined at ultrasonic frequencies. Mechanical response of these ceramics was found to be flaw size dependent. A threshold stress exists below which these ceramics are fatigue resistant. Creep response in hot-pressed silicon nitride was characterized by parallel processes, a persistent nonrecoverable plastic deformation and recoverable viscoelastic deformation. A steady-state component of creep was not found. An improved model for the creep process was developed to account for the creep and recovery behavior. (ERA citation 04:047045)

GA-A-15495 PC **A02**/MF **A01**
General Atomic Co., San Diego, CA.
Strength of Irradiated Graphite: A Review.
R. J. Price. Jul 79, 15p CONF-7906105-1
Contract EY-76-C-03-0167
Meeting on mechanical behavior of graphite for high temperature reactors, Gif-sur-Yvette, France, 11 Jun 1979.

Experimental data on the mechanical strength of nuclear graphite subjected to fast neutron irradiation are reviewed. At fluences below the turnaround point, the mean tensile, flexural, or compressive strength, S, increases over the unirradiated value, S sub 0 , in a manner related to the irradiation-induced change in Young's modulus, E: S/S sub 0 = (E/E sub 0)/sup K/. The exponent, k, takes a value between 0.5 and 1, depending on the graphite grade, the irradiation temperature, and the method used for determining E. A value of 0.5 for k would be expected from the Griffith--Irwin theory of fracture if neither the critical flaw size nor the effective surface energy of a crack is altered by irradiation; a value of 1 would be expected if the strain at failure remains constant. At higher fluences, when expansion starts, strength values decrease. The effect of irradiation on the statistical spread of the strength measurements depends on the graphite grade and the neutron fluence. At fluences below the turnaround point, the coefficient of variation of strength determinations for standard reactor grades is little changed, but at higher fluences, and for fine-grained, high strength materials, the coefficient of variation may increase. Although specimens for different locations in a graphite log, or from different logs of the same grade, vary in strength, under the same conditions of irradiation the fractional increase in strength of these specimens will be similar. After irradiation, graphite appears to have a slightly greater resistance to cyclic fatigue, as measured by the homologous stress limits for survival to a specified number of cycles. (ERA citation 04:052012)

N80-10319/5 PC **A06**/MF **A01**
United Technologies Research Center, East Hartford, Conn.
Development of Silicon Nitride of Improved Toughness.
Final Report.
J. J. Brennan. 2 Oct 79, 111p NASA-CR-159676, R79-914364-12
Contract NAS3-21375

The application of reaction sintered Si2N4 energy absorbing surface layers to hot-pressed Si3N4 was investigated. The surface layer was formed by in-place nitridation of silicon powder. It was found that reaction sintered Si3N4 layers of 1 mm thickness, fabricated from either -100, +200, -200, or -325 mesh Si powder and nitrided in 96% N2/4% H2 so that approximately 20-25 vol % unnitrided Si remained in the layer, resulted in a sevenfold increase in ballistic impact resistance of a 0.64 cm thick hot-pressed Si3N4 substrate from RT 1370 C. Both NC-132 Si3N4, with MgO additive, and NCX-34 Si3N4, with Y2O3 additive, were evaluat-

ed as substrate material. The finer grain size -200 and -325 mesh nitrided Si layers were for their smoothness and relatively high density. It was found that nitriding in N2/H2 mixtures, rather than pure N2, resulted in a microstructure that did not substantially degrade the strength of the hot-pressed Si3N4 substrate. Thermal cycling tests on the RSSN/HPSN combinations from 200 C to 1370 C for 75 cycles in air did not degrade the impact resistance nor the interfacial bonding, although a large amount of internal silica formation occurred within the RSSN layer. Mach 0.8, 5 hr, hot gas erosion tests showed no surface recession of RSSN layers at 1200 C and slight surface recession at 1370 C.

PB80-802382 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Carbon and Graphite. Part 3. Graphite--Physical, Mechanical, and Structural Studies. Volume 1. 1964-1976 (A Bibliography with Abstracts).
Rept. for 1964-76,
William E. Reed. Dec 79, 236p

Research on the physical, mechanical, and structural properties of graphite are presented. Studies of graphite composites and fibers are excluded along with graphite chemistry. The majority of these studies deal with the use of graphite as a reactor material. (This updated bibliography contains 226 abstracts, none of which are new entries to the previous edition.)

PB80-802390 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Carbon and Graphite. Part 3. Graphite--Physical, Mechanical, and Structural Studies. Volume 2. 1977-October, 1979 (A Bibliography with Abstracts).
Rept. for 1977-Oct 79,
Mona F. Smith. Dec 79, 103p
Supersedes NTIS/PS-78/1052, NTIS/PS-77/0846, NTIS/PS-76/0687, NTIS/PS-75/615, and NTIS/PS-75/181.

Research on the physical, mechanical, and structural properties of graphite are presented. Studies of graphite composites and fibers are excluded along with graphite chemistry. The majority of these studies deal with the use of graphite as a reactor material. (This updated bibliography contains 102 abstracts, 29 of which are new entries to the previous edition.)

PB80-802408 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Carbon and Graphite. Part 4. Graphite--Chemical Properties (A Bibliography with Abstracts).
Rept. for 1964-Oct 79,
Diane M. Cavagnaro. Dec 79, 249p
Supersedes NTIS/PS-78/1053, NTIS/PS-77/0847, NTIS/PS-76/0688, and NTIS/PS-75/616.

Research citations cover the chemistry of graphite. Studies are included on vaporization, thermodynamics, surface chemistry, intercalation compounds, chemisorption, and oxidation. (This updated bibliography contains 228 abstracts, 32 of which are new entries to the previous edition.)

PB80-802416 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Carbon and Graphite. Part 5. Carbon Research (A Bibliography with Abstracts).
Rept. for 1964-Oct 79,
William E. Reed. Dec 79, 185p
Supersedes NTIS/PS-78/1054, NTIS/PS-77/0848, NTIS/PS-76/0689, NTIS/PS-75/617, and NTIS/PS-75/182.

The cited studies cover the use, physical and mechanical properties, production, and chemistry of various forms of carbon, such as carbon black, carbon foams, chars, coke, and activated carbon. Graphite and glassy carbon research are covered in separate bibliographies, as are studies on carbon and graphite fibers and their composites. (This updated bibliography contains 180 abstracts, 17 of which are new entries to the previous edition.)

PB80-802424 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Carbon and Graphite. Part 6. Glassy Carbon (A Bibliography with Abstracts).
Rept. for 1964-Oct 79,
William E. Reed. Dec 79, 74p
Supersedes NTIS/PS-78/1055, NTIS/PS-77/0849, NTIS/PS-76/0690, NTIS/PS-75/618, and NTIS/PS-75/183.

The research reports describe glassy carbon preparation, structure, properties, composites, and alloys with metals. (This updated bibliography contains 68 abstracts, 8 of which are new entries to the previous edition.)

SAND-78-2444C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Investigations of the Effect of the Morphology of Nb Dopant on Lead Zirconate Ceramic.
J. D. Keck, and P. D. Wilcox. 1979, 8p CONF-790670-2
Contract EY-76-C-04-0789
IEEE international symposium on application of ferroelectric, Minneapolis, MN, USA, 13 Jun 1979.

The microstructures of ferroelectric ceramics are a result of the dopants and of the many process variables associated with raw materials, powder processing, and ceramic firing. Metal ion substitutions of higher than normal valency are used as sintering aids to promote densification, to increase electrical resistivity, and to develop mature homogeneous microstructures with desirable piezoelectric and ferroelectric properties. Investigations are reported for the barium modified lead zirconate system which is analogous to the lead zirconate titanate system, in which Nb is used as a sintering aid. The morphology and concentration of the Nb are shown to affect both electrical properties and the microstructure. (ERA citation 04:051995)

11C. Coating, Colorants, and Finishes

AD-A075 791/4 Not available NTIS
University of Western Ontario London Faculty of Engineering Science
Development of Oxide Diffusion-Barrier on Refractory Metals.
C. Roy , and S. Pastein. 21 Aug 73, 7p
Availability: Pub. in Jnl. of Materials Science, v9 p1004-1010 1974 (No copies furnished by DTIC).

No abstract available.

AD-A075 872/2 PC **A02**/MF **A01**
Ohio State Univ Research Foundation Columbus
Some Physical Properties of Enamels Developed for Use at High Temperatures on Several Nonstrategic Steels.
Technical rept.,
R. Maynard King , and Louis J. Trostel, Jr. Oct 51, 14p 67, WADC-TR-52-25
Contract W-33-038-ac-14217

This report covers results of tests made to determine the protective value at high temperatures of six enamels applied to a group of nonstrategic steels being investigated as possible substitute materials for stainless steel or Inconel in jet-propelled engines or other devices. (Author)

AD-A075 878/9 PC **A02**/MF **A01**
Illinois Univ At Urbana-Champaign Dept of Ceramic Engineering
Coating of Stainless- and Carbon-Steel Foil.
Rept. no. 59,
W. J. Plankenborn , and D. G. Bennett. Dec 51, 16p WADC-TR-52-27
Contract W-33-038-ac-14520

Ceramic coatings developed for application to alloy metals and other coatings developed for ingot iron and low carbon steel were successfully applied to specimens cut from .002 inch thick sheets of Inconel, Nichrome, 18-8 stainless-steel types 321 and 347 and to carbon steel, respectively. Scouring the metal surfaces with coating slip, followed by washing and drying, proved to be a satisfactory method for preparing the alloy metals for coating. A ten-minute anneal at 1800 F improved the adherence of the coatings to the metal, particularly in the cases of the Inconel and Nichrome foils which had polished surfaces. Scouring and pickling were both found to be satisfactory methods for the preparation of the carbon steel foil. With extended heating at 1900 F all uncoated alloy specimens showed some oxidation, as evidenced by a reduction in cross sectional area. Similar specimens, protected by refractory ceramic coatings, showed little or no reduction in metal thickness. Complete oxidation of the uncoated carbon steel foil occurred after 17 hours at a temperature of 1400 F while coated specimens withstood a total of 64 hours at temperatures up to 1600 F. (Author)

AD-A075 985/2 PC **A02**/MF **A01**
Ohio State Univ Research Foundation Columbus
Nickel-Magnesia Cermet Coatings.
Technical rept.,
Earle T. Montgomery , and Jack A. Lytle. Jun 52, 19p WADC-TR-52-166
Contract AF 33(616)-3

This report is supplementary to Reports Nos. 46 and 58 of this series. It reviews the possibilities of a metal-bonded refractory coating for the protection of the sheet metal parts of jet propelled mechanisms. Both the theory and practice involved in the preparation and application of a nickel-magnesia cermet coating are discussed. A means is suggested by which the No. 10Ni + MgO coating can be made impervious and at the same time more adherent, especially to low alloy and hence less strategic steels. (Author)

AD-A075 989/4 PC **A04**/MF **A01**
Bjorksten Research Lab Inc Madison Wis
Development of Electrically Conductive Transparent Coatings for Acrylic Plastic.
Technical rept.,
John Bjorksten , Harry L. Hamilton , Evelyn E. Smith , and Robert J. Roth. Dec 52, 73p WADC-TR-52-48
Contract AF 33(038)-23319

In order to dissipate precipitation electrostatic charges built up on transparent plastic aircraft canopies during flight an electrically conductive transparent coating, easily applied to formed aircraft canopies made from acrylic sheet conforming to Specification MIL-P-5425, has been developed. The composite material, i.e., the acrylic and applied coating, retains essentially all the original mechanical properties, optical clarity, and light transmittance characteristics of the base material. Its surface resistance is in the range 1-10 megohms per square and is relatively insensitive to the wide variation in relative humidity, temperature, and altitude conditions that might be expected in aircraft operation. The coated acrylic is transparent to radio frequency energy as well as light, its dielectric loss factor being only slightly higher than the acrylic alone. It has sufficient permanence to the effects of sunlight, temperature variations, crazing, rain, abrasion, wind erosion, and oil absorption associated with the normal operation and maintenance of aircraft. Three F-86 aircraft canopies, two new and one removed from service, were coated with the developed coating. The new canopies were tested in flight at Wright Air Development Center and performed satisfactorily.

N80-10344/3 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Analysis of the Response of a Thermal Barrier Coating to Sodium and Vanadium Doped Combustion Gases.
R. A. Miller. 1979, 23p NASA-TM-79205, DOE/NASA/2593-79/7
Contract EF-77-A-01-2593
Subm-Sponsored in Part by DOE. Conf-Presented at 8TH Midwest High Temperature Chemistry Conf., Milwaukee, Wis., 4-6 Jun. 1979.

Published data on the behavior of zirconia-based thermal barrier coatings exposed to combustion gases doped with sodium and vanadium were analyzed with respect to calculated condensate dew points and melting points. Coating temperatures, failure locations, and depths were reasonably well correlated.

SAND-78-2294C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.

CVD Boride Coatings for Erosion Applications.
E. Randich. 1979, 4p CONF-790903-1
Contract EY-76-C-04-0789
International conference on erosion by liquid and solid impact, Cambridge, UK, 3 Sep 1979.

Chemical vapor deposition (CVD) coatings of TiB sub 2 and ZrB sub 2 have been obtained in the temperature range of 1073 to 1273 K. The coatings exhibit significantly improved erosion resistance when compared to the materials in their hot pressed forms. The reasons for the excellent erosion performance of the borides, as compared to cemented carbides or hot pressed materials, are examined and discussed. A successful application of CVD TiB sub 2 , as a coating on a high pressure let-down valve stem in coal slurry service, is presented and discussed. (ERA citation 04:051982)

SAND-79-1008C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Optimization of Multi-Layer AR Coatings.
F. W. Sexton. 1979, 3p CONF-790547-1
Contract AC04-DP7600789
Electrochemical Society meeting, Boston, MA, USA, 7 May 1979.

A computer code to optimize multi-layer AR coatings for terrestrial solar cell applications has been developed. The optimum thicknesses of up to 15 layers are determined using a sequential search technique which maximizes the integral of the product of the internal spectral response of a given cell, the solar spectrum at AM 1, 1.5, or 2, and the transmittance of the AR coating. This optimization criterion allows the AR coating to be designed to match the spectral response of a given cell and the solar spectrum in which it will operate. All coatings reported were developed for a p exp + nn exp + cell design with a back-surface aiding field. (ERA citation 04:048285)

SAND-79-1493C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Formation, Adhesion and Mechanical/Chemical Properties of Protective Coatings.
D. M. Mattox. 1979, 5p CONF-790749-1
Contract EY-76-C-04-0789
Conference on advanced materials for alternate fuel capable directly fired heat engines, Castine, ME, USA, 30 Jul 1979.

Some general considerations for protective coatings are discussed. It is suggested that ceramic coatings may provide a class of coatings applicable to high temperature turbine blades for use in a corrosive/erosive environment. In particular, the ceraming glass materials would seem to hold promise, but little or nothing has been done on depositing these materials by vacuum processes. (ERA citation 04:051965)

11D. Composite Materials

AD-A075 764/1 PC **A03**/MF **A01**
Aerospace Corp El Segundo Ca Materials Sciences Lab
Tribological Behavior of Metal Matrix Composites.
Interim rept.,
M. F. Amateau , R. F. Flowers , and E. Eliezer.
14 Sep 79, 32p TR-0079(4762-03)-1, SAMSO-TR-79-56
Contract F04701-78-C-0079

The wear and friction behavior of continuous graphite-fiber-reinforced metal matrix composites was investigated. Composite materials were tested against 4620 steel at 54 m/sec at room temperature in air without lubricant. The graphite fibers studied included rayon-based, pitch-based, and polyacrilonitrile (PAN)-based fibers. Both high-modulus and high-strength PAN-based fibers were examined. The fibers were incorporated into Cu- and Ag- based alloys by means of a liquid metal infiltration technique. The results of this study indicate that the type of graphite fiber in the composite is the most significant factor in the wear and friction behavior of metal matrix composites. In some high-modulus fiber Sn-bronze composites fiber fraction influences wear rate, but not coefficient of friction. Neither the matrix alloy nor the composite tensile strength per se correlates with the friction and wear properties; however, there are specific trends for the various matrix alloys. (Author)

AD-A076 198/1 PC **A04**/MF **A01**
Air Force Materials Lab Wright-Patterson AFB Oh
Basic Concepts of Statistics and Their Applications in Composite Materials.
Final rept. 1 Dec 78-31 Jan 79,
Won J. Park. Jun 79, 70p Rept no. AFML-TR-79-4070

This report is intended to present, in a simple and concise way, basic concepts of statistics and their applications in composite material engineering. The subjects are selected from the standpoint of key concepts and applications rather than theory and elegance. It is envisioned that this report is suitable for a short course (or refresher course) for composite material engineers, who have been working with data but have not done any formal course work in statistics. (Author)

AD-A076 334/2 PC **A03**/MF **A01**
Dyna East Corp Wynnewood Pa
Effects of Proof-Test on the Strength and Fatigue Life of a Unidirectional Composite.
Interim technical rept. 1 Apr 78-31 Mar 79,
A. S. D. Wang , Pei Chi Chou , and James Alper.
May 79, 32p AFML-TR-79-4089
Contract F33615-77-C-5039

The effects of a static proof-load on the statistical distribution of the static strength and fatigue life of a unidirectional graphite-epoxy laminate (As-3501-05) are investigated experimentally. Loading mode for both the static and fatigue tests is restricted to uniaxial tension in the fiber direction. 6-ply tension coupons with dimensions of 22.9 cm x 1.9 cm are used; and all tests are conducted using a closed-loop Instron tester, under room temperature (21 C) and ambient humidity (60% R.H.) conditions. The data are analyzed using a two-parameter Weibull distribution in conjunction with the max. likelihood method for parameter estimation. Results show that proof-load can guarantee a min. static strength, and to less degree can assure a min. fatigue life. (Author)

EPRI-EL-1093 PC **A05**/MF **A01**
Lindsey Industries, Inc., Azusa, CA.
Further Development of Polysil Material Systems for Electrical Applications. Final Report.
J. E. Schroeder. May 79, 91p

Polysil is an inexpensive composite dielectric material consisting of a blend of aggregates bound together in an organic matrix. Several types of coatings can be applied to the insulator surfaces to enhance their resistance to moisture. Polysil has the advantage of room temperature processing, which enables metallic inserts to be cast in place. Internal electric grading is possible because the thermal coefficient of expansion can be modified to match that of the embedments. It has also shown excellent weathering capability under high voltage stress. The processing methods and mechanical and dielectric properties of Polysil are described. (ERA citation 04:048952)

JPL-PUB-79-51 PC **A05**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Review of Composite Material Applications in the Automotive Industry for the Electric and Hybrid Vehicle. Annual Report, November 1978.
J. L. Bauer. 15 Jul 79, 90p
Contract EM-78-I-01-4209

A comprehensive review is made of the state-of-the art in regard to the use of composite materials for reducing the structural mass of automobiles. Reduction of mass will provide, in addition to other engineering improvements, increased performance/range advantages that are particularly needed in the electric and hybrid vehicle field. Problems to be overcome include the attainment of mass production techniques and the prevention of environmental hazards. (ERA citation 04:053416)

PB80-104466 Not available NTIS
National Bureau of Standards, Washington, DC.
High-Pressure Industrial Laminates for Cryogenic Applications.
Final rept.,
M. B. Kasen. 1979, 1p
Sponsored in part by Department of Energy, Washington, DC.
Pub. in Compos. Tech. Rev. Research Briefs, 1, n3, p17 1979.

The research brief describes NBS/industry efforts to provide industry with a commercial source of high-pressure industrial laminates having predictable mechanical and physical properties at cryogenic temperatures.

PB80-802366 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Carbon and Graphite. Part 1. Carbon and Graphite Fibers and Fiber Composites. Volume 4. September, 1977-October, 1979 (A Bibliography with Abstracts).
Rept. for Sep 77-Oct 79,
William E. Reed. Dec 79, 247p
Supersedes NTIS/PS-78/1050, NTIS/PS-77/0844, NTIS/PS-76/0685, NTIS/PS-75/613, and COM-74-11527. See also Volume 1, 1964-1973, NTIS/PS-75/612, Volume 2, 1974-July, 1976, NTIS/PS-77/0843, and Volume 3, August, 1976-August, 1977, NTIS/PS-78/1049.

Citations cover reinforcement of numerous polymers and metals by carbon and graphite fibers. Studies include processing, design, properties, stress analysis, and performance of the composite structures or parts. Composites from polyimide, epoxy, and aluminum matrices are among the types cited. Fabrication and testing of materials for rocket nozzles, reentry vehicles, aircraft components, automobiles, and ships are included. (This updated bibliography contains 241 abstracts, 100 of which are new entries to the previous edition.)

PB80-802374 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Carbon and Graphite. Part 2. Carbon and Graphite Composites (Excluding Carbon Fiber Composites) (A Bibliography with Abstracts).
Rept. for 1964-Oct 79,
William E. Reed. Dec 79, 268p
Supersedes NTIS/PS-78/1051, NTIS/PS-77/0845, NTIS/PS-76/0686, NTIS/PS-75/614, and COM-74-11527.

Reports on carbon or graphite composites which are not specifically concerned with carbon or graphite fibers are cited. This includes studies on non-fiber carbon reinforcement, carbon or graphite matrix composites, applications, properties, fabrication, and structural analysis. The majority of research concerns aircraft components and ablative materials for rockets. (This updated bibliography contains 262 abstracts, 48 of which are new entries to the previous edition.)

11E. Fibers and Textiles

AD-A075 862/3 PC **A02**/MF **A01**
Wright Air Development Center Wright-Patterson AFB Oh
Development of Fabrics for USAF Summer Uniforms Using Synthetic Fibers.
Technical rept. Jul-Oct 51,
Rama Maxwell Ellis, Jr. Jul 52, 25p Rept no. WADC-TR-52-112

This project was undertaken as a result of a letter from Headquarters USAF, dated 29 March 1951, entitled 'Conservation of Wool', and because it was believed that synthetic fibers possessed an untapped potential adaptable to the needs of the USAF for uniform purposes. 'Dacron', a polyester fiber, was chosen as the principal constituent in this investigation because of its unusual properties. The manner in which this fiber would react when used in a uniform fabric and when blended with other fibers could not be determined by laboratory methods; hence the service wear test. The results of this test indicate that Dacron, when blended with wool or viscose rayon in a fifty-to-fifty weight ratio, will produce a fabric superior to either the presently used 100% wool or the experimental 100% Dacron fabric.

AD-A076 051/2 PC **A08**/MF **A01**
Georgia Inst of Tech Atlanta Engineering Experiment Station
A Study of the Effect of Twist on the Properties of Synthetic Filament Yarns.
Technical rept.,

Group 11E—Fibers and Textiles

J. C. Taylor, C. Y. Widequist, M. M. Christie, and V. R. Thompson . Mar 52, 156p WADC-TR-52-55
Contract AF 33(038)-10179

As synthetic textile fibers have varied uses in today's ideas and materials, a need has been felt for an investigation into the effect of twist on synthetic yarns. It was decided that in the study of synthetic yarns, those used most in USAF materials would be evaluated. Yarns studied included five deniers of Viscose Rayon from three producers; ten deniers of nylon; four deniers of Orlon; and three deniers of Dacron. The main objective of the program was the study of the effect of twist on the following properties of the yarns: (1) Denier, (2) Diameter, (3) Breaking strength, (4) Elongation, (5) Energy Absorption, and (6) Elastic Recovery. Generally the results show that the effect of twist on any characteristic of yarn is greater for the higher denier yarns than for the low denier yarns. Detailed data are given in both tabular and graphic form, for the effect of twist on the properties of the individual yarns.

PAT-APPL-6-046 733 PC **A02**/MF **A01**
Department of the Army Washington DC
Laminated, Highly Sorbent, Active Carbon Fabric.
Patent Application,
Gilbert N. Arons, and Richard N. Macnair. Filed 7 Jun 79, 12p AD-D006 406/3
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An object of the invention is to provide a laminated, highly sorbent, active carbon fabric that will be permeable to moisture vapor, resistant to sweat penetration and have low levels of thermal insulation while being capable of sorbing substantial amounts of toxic chemical vapors and, therefore, of preventing such chemical vapors from penetrating through clothing made of such fabric to the skin of wearers of such clothing. Another object of the invention is to provide a process for making a highly sorbent, active carbon fabric having characteristics such as those described in the preceding paragraph.

PAT-APPL-6-057 858 PC **A02**/MF **A01**
Department of Agriculture, Washington, DC.
Shrinkproofing Wool with Copper Salts of Carboxylic Acids.
Patent Application,
Nathan H. Koenig, and Mendel Friedman. Filed 16 Jul 79, 13p PB80-114820
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Proteinaceous fibers are modified by first contacting the fibers with an aqueous solution of a cupric salt of a carboxylic acid containing from 2-18 carbon atoms, and then contacting the so-treated fibers with a hot, semipolar, water-miscible organic solvent. The modified fibers exhibit increased resistance to shrinkage.

PB80-801533 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Fire Resistance of Fibers and Textiles. Volume 2. 1976-November, 1979 (Citations from the NTIS Data Base).
Rept. for 1976-Nov 79,
Diane M. Cavagnaro. Dec 79, 224p
Supersedes NTIS/PS-78/1200, NTIS/PS-77/1044, NTIS/PS-76/0864, NTIS/PS-75/757, and NTIS/PS-74/111. For the companion Published Searches of the Engineering Index Data Base, see NTIS/PS-76/0865, NTIS/PS-76/0866, NTIS/PS-78/1201 and PB80-801541. See also Volume 1, 1970-1972, NTIS/PS-76/0865.

The cited reports of federally-funded research relate to the preparation and flammability of flame resistant organic fibers and textiles. Topics include new cellulosic synthetic resins, flameproofing additives, standards, and safety of the existing consumer products. (This updated bibliography contains 215 abstracts, 26 of which are new entries to the previous edition.)

PB80-801541 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Fire Resistance of Fibers and Textiles. Volume 4. 1977-November, 1979 (Citations from the Engineering Index Data Base).
Rept. for 1977-Nov 79,
Diane M. Cavagnaro. Dec 79, 246p
Supersedes NTIS/PS-78/1202, NTIS/PS-77/1045, and NTIS/PS-76/0867. For the companion Published Searches of the NTIS Data Base, see NTIS/PS-77/1043 and PB80-801533. See also Volume 1, 1970-1972, NTIS/PS-76/0865, Volume 2, 1973-1974, NTIS/PS-76/0866, and Volume 3, 1975-1976, NTIS/PS-78/1201.

The cited reports from a worldwide literature survey relate to the preparation and flammability of flame resistant fibers and textiles. They include flammability standards, testing, synthesis, safety factors of existing consumer products, flameproofing additives, and the durability of the product tested. (This updated bibliography contains 239 abstracts, 105 of which are new entries to the previous edition.)

11F. Metallurgy and Metallography

AD-A075 657/7 PC **A07**/MF **A01**
National Bureau of Standards Boulder Co Thermophysical Properties Div
Titanium Combustion in Turbine Engines.
Final rept.,
Thomas R. Strobridge , John C. Moulder , and Alan F. Clark. Jul 79, 132p NBSIR-79-1616, FAA-RD-79-51
Contract DOT-FA78WAI-831

Pure and alloyed titanium components are routinely used in aircraft turbine engines because of their uniquely high strength-to-weight ratios among structural metals, combined with excellent fatigue and corrosion resistance. Like most other metals, titanium is combustible under certain conditions of temperature, pressure and oxygen concentration and in fact there have been several instances of titanium combustion in service engines. Contemporary titanium use in aircraft turbine engines and the limits of that use are explored. Combustion incidents and their causes are discussed as well as the typical extent of damage. Current preventative measures are outlined. For better understanding, the fundamentals of metal combustion and the experimental research related to titanium combustion are thoroughly treated and analytical combustion models are presented. Finally, the relevant experimental combustion data are correlated as a function of static temperature and Reynolds number and compared to the model predictions. (Author)

AD-A075 670/0 Not available NTIS
Australian Defence Scientific Service Melbourne
Effect of Pressurization on the Yield Point of Brass,
I. E. French , and P. F. Weinrich. 10 Jun 74, 2p
Availability: Pub. in Materials Science and Engineering, v17 p293-295 1975 (No copies furnished by DTIC).

No abstract available.

AD-A075 760/9 PC **A02**/MF **A01**
United States Steel Corp Monroeville PA Research Lab
Effect of Purity on Reliability Characteristics of High-Strength Steel.
Interim rept. no. 1,
H. M. Reichhold, J. G. Bassett, S. R. Novak, and L. F. Porter. 15 Nov 75, 25p 76-H-020(018/011-1), GIDEP-E138-1618
Contract F33615-75-C-5137

This report describes the melting procedures used to produce the ultra-high-purity and conventional-purity steels, the rolling and heat-treatment procedures, and the properties obtained for the conventional-purity steels. Vacuum-induction heats of the high-purity-level steels were produced by special multiple-melting procedures and cast into 7-1/2-inch-diameter (19 cm) ingots. The ingots have been shipped to Latrobe Steel Company for vacuum-arc remelting (VAR) to achieve further reductions in oxygen and nitrogen contents and a refined cast structure prior to forging slabs and rolling to plate.

AD-A075 790/6 Not available NTIS
Saskatchewan Univ Saskatoon Dept of Chemistry and Chemical Engineering
Effect of Slurry Abrasion on the Anodic Dissolution of Iron in Water,
John Postlethwaite , and Mark W. Hawrylak. Mar 74, 5p
Availability: Pub. in Corrosion, v31 n7 p237-240 Jul 75 (No copies furnished by DTIC).

No abstract available.

AD-A075 795/5 Not available NTIS
Manitoba Univ Winnipeg Dept of Physics
Electrical Properties of Exchange-Enhanced Systems: Fe in (Pd95Rh5),
M. E. Colp , R. M. Roshko , and Gwyn Williams. 30 Apr 74, 19p DRB-REPRINT-416
Availability: Pub. in Jnl. of Low Temperature Physics, v17 n3/4 p203-221 1974 (No copies furnished by DTIC).

No abstract available.

AD-A075 817/7 Not available NTIS
Massachusetts Inst of Tech Cambridge
Refining by Fractional Melting.
Doctoral thesis,
A. L. Lux , and M. C. Flemings. 31 May 78, 6p
ARO-14858.1-MS
Contract DAAG29-77-C-0023
Availability: Pub. in Metallurgical Transactions B, v10B p79-84 Mar 79 (No copies furnished by DTIC).

No abstract available.

AD-A075 825/0 Not available NTIS
Manitoba Univ Winnipeg Dept of Physics
Temperature-Dependent Resistivity of PtCr Alloys,
R. M. Roshko , and Gwyn Williams. 16 Aug 73, 9p
Availability: Pub. in Physical Review B, v9 n11 p4945-4953, 1 Jun 74 (No copies furnished by DTIC).

No abstract available.

AD-A075 852/4 PC **A02**/MF **A01**
National Bureau of Standards Washington Dc
Microcreep of Instrument Grade Beryllium.
Technical publication,
R. S. Polvani , and Bruce W. Christ. 1979, 22p
Rept no. NBSIR-79-1785
Contract N00014-79-F-0031
Pub. in Proceedings of the National SAMPE (24th), p1-11, 9 May 79.

No abstract available.

AD-A075 877/1 PC **A07**/MF **A01**
Rensselaer Polytechnic Inst Troy N Y
Magnesium Alloy Research Studies.
Technical rept.,
A. Jones , J. H. Lennon , R. R. Nash , W. H. Chang , and E. G. MacPeek. Sep 52, 140p
WADC-TR-52-169
Contract W-33-038-ac-22542

Diagrams are presented to show the constitution at 500 F and 700 F for the magnesium-lithium-aluminum and magnesium-lithium-zinc alloy systems. These diagrams were determined mainly by microscopic examination of alloys quenched from elevated temperatures. The solubility for aluminum and for zinc was less at 500 F than at 700 F but solubility for lithium was almost the same at these two temperatures. The study of dilute magnesium alloys found a good combination of properties for magnesium-1.0% zinc-0.4% cerium. Addition of cerium refined the grain structure and introduced a small amount of a second constituent. The best properties were obtained with a fine equiaxed grain structure produced by warm rolling and annealing just above the recrystallization range. These conditions of structure and properties were not obtainable by a single cycle of cold rolling and annealing. Single crystals of high purity magnesium were grown by controlled solidification in a gradient furnace. The furnace and the mold remained stationary and only the temperature gradient moved. The conditions of growth were found to be more critical for single crystals of magnesium-aluminum and magnesium-zinc alloys.

AD-A075 883/9 PC **A04**/MF **A01**
Texas Univ At Austin
Development of Composite Spectrophotometric Procedures for the Analysis of Low-Alloy Steels and of Aluminum and Its Alloys.
Technical rept.,
Gilbert H. Ayres , and Stanley H. Simonsen. Nov 52, 70p WADC-TR-52-246
Contract AF 33(038)-23168

Procedures have been developed for the spectrophotometric analysis of the constituents of low-alloy steels and of aluminum and its alloys, using a single sample to give a composite solution in which most of the elements are determined. In general, the conventional spectrophotometric methods for the various elements have been employed, modified as necessary for the use of the single composite solution technique. The methods have been tested thoroughly, in the hands of several different operators, by applying them to a variety of standard samples; the results of these tests are tabulated in the report. Detailed procedures, with explanatory notes, to serve as a practical laboratory manual are given for the spectrophotometric analysis of low-alloy steels for chromium, copper, manganese, molybdenum, nickel, phosphorus, silicon, and vanadium, and for the anlaysis of aluminum and its alloys for chromium, copper, iron, manganese, molybdenum, nickel, titanium, and vanadium. The molybdisilicic acid method for silicon in the aluminum samples did not give satisfactory results; the conventional gravimetric method for this determination is recommended. (Author)

AD-A075 886/2 PC **A03**/MF **A01**
Illinois Univ At Urbana-Champaign Engineering Experiment Station
Plastic Behavior of Engineering Materials. Part 1. Axial Tension and Bending Interaction Curves For Members Loaded Inelastically.
Technical rept.,
D. O. Brush , O. M. Sidebottom , and J. O. Smith. Aug 52, 49p WADC-TR-52-89-PT-1
Contract AF 33(038)-15677
See also Part 2, AD-A075 887.

This paper presents a theoretical method for constructing dimensionless interaction curves for members subjected to combined tension and bending loads that produce inelastic strains, and presents experimental results which verify the theory. Each interaction curve represents the total range of the ratios of axial load to bending moment which will cause inelastic strains to extend to a given depth in the member. Experimental interaction curves were obtained from eccentrically loaded tenison members of rectangular cross sections made from three strain hardening materials, namely annealed rail steel and aluminum alloys 24S-T4 and 75S-T6. Good agreement was found between theory and experiment. In order to design a member subjected to combined axial and bending loads by use of the interaction curves, the lateral deflection of the member must be estimated. Three orders of approximation for the lateral deflection of eccentrically loaded tension members are presented. The problem of combined bending and axial compressive loads is discussed and research based on the methods of analysis developed in this investigation is suggested for solving the buckling laod of a member subjected to combined bending and axial compressive loads. Some illustrative problems are solved in the Appendix which show how the results of this investigation may be used. (Author)

AD-A075 887/0 PC **A04**/MF **A01**
Illinois Univ At Urbana-Champaign Engineering Experiment Station
Plastic Behavior of Engineering Materials. Part 2. Partially Plastic Thick-Walled Cylinders.
Technical rept.,
M. C. Steele. Aug 52, 67p WADC-TR-52-89-PT-2
Contract AF 33(038)-15677
See also Part 1, AD-A075 886.

This report presents experimental and theoretical work on the overstraining of thick-walled cylinders. Four mild steel cylinders (2:1 wall ratio) were subjected to internal fluid pressure and strains at the bore and the outside surfaces were measured. In addition, the mechanism of flow was studied by polishing the end and outside surfaces for the observation of Lueders lines. A theoretical analysis is given which is based on results from a quantitative comparison of certain previous theories and available experimental data. The solution is in closed form and is applicable to strain-hardening materials. Observations disagree with theoretical assumptions concerning the progression of yielding; wedge regions of overstrained material, occupying a small fraction of the total volume, characterize the yielding process. Discrepancies with theory are observed in the measured strains; fully plastic load-carrying capacities predicted from theory are higher than those observed in the experiments. Instability of deformation (creep) under maintained constant load is discussed. It is concluded that theoretical analyses, in their present form, do not cope adequately with the inelastic problem concerning the wedge type of yielding in two and three dimensional, non uniform stress fields. Suggestions are given for further research. (Author)

AD-A075 897/9 PC **A02**/MF **A01**
Naval Research Lab Washington Dc
Fractographic and Microstructural Analysis of Fatigue Specimens of A302 Grade B Steel Tested in Air at Room Temperature.
Progress rept.,
G. Gabetta , and V. Provenzano. 28 Sep 79, 22p NRL-MR-4062, NUREG-CR-0968

Microscopic studies were undertaken to characterize the failure processes and to establish correlations with fatigue crack propagation data of Type A302-B ferritic steel tested in air at room temperature. A cooperative program was established between the Naval Research Laboratory (NRL) and the Centro Informazioni Studi Esperienze (CISE) to investigate the fatigue properties of this ferritic steel for nuclear pressure vessel applications. Failed specimens have been examined by scanning electron microscopy (SEM), by metallographic techniques, and by energy dispersive x-ray microanalysis. SEM examination of the fracture surfaces of specimens cut in the T-L direction revealed the presence of inclusion bands above an observed delta K threshold value. Subsequent x-ray image scans and corresponding energy spectra showed that the bands were manganese-sulfide inclusions. The inclusions bands resulted in increased crack growth rate in these specimens compared to those cut in the L-T orientation specimens. The delta K threshold value necessary to activate the inclusion bands is thought to be a measure of the cohesive strength between the inclusions and the material matrix. The failure mode of all the specimens tested was transgranular; extensive microcracking was also present in the fracture surfaces. The microcracking did not appear to have affected the crack propagation behavior. (Author)

AD-A075 981/1 PC **A03**/MF **A01**
Douglas Aircraft Co Inc Santa Monica Calif
The Influence of Extraneous Elements in D.C. Arc Spectral of Ferrous Alloys.
Technical rept.,
Darwin P. Jensen , and J. F. Young. Jul 52, 44p WADC-TR-52-168
Contract AF 33(038)-23304

The influence of one alloying element upon the spectral line intensity of any other alloying element was subjected to investigation in the D. C. Arc. The study was carried out by making homogeneous metallic alloys in an induction furnace. Manganese, silicon, nickel, chromium, molybdenum, vanadium, aluminum and copper were used as the alloying elements in an iron matrix, with percentage magnitudes commonly found in low alloy steels. It is concluded that: (1) The only influence which could be attributed to any of these elements was that of copper upon the line intensity of manganese. (2) Oxygen contained within the metallic sample has a marked influence on the spectral line intensity of chromium. (3) Some other element or elements not included in this investigation such as carbon, sulfur and/or phosphorus affects the line intensities of nickel, silicon and manganese. (4) Alloys can be melted in an induction furnace without change in chemistry by employing the proper techniques. (Author)

AD-A075 986/0 PC **A09**/MF **A01**
Rensselaer Polytechnic Inst Troy N Y
Ternary Magnesium-Lithium Base Constitution Diagrams and Magnesium Alloys of Low Alloy Additions.
Technical rept.,
Augustus Jones. Mar 51, 198p WADC-TR-52-41
Contract W-33-038-ac-22542(21337)

This report summarizes the experimental work on the study of two independent subjects. The first part of the report describes the development and application of techniques for establishing phase boundaries in the magnesium-lithium-aluminum and magnesium-lithium-zinc ternary systems. Based primarily on microscopic examination, the tentative locations of phase boundaries at 700 degrees F are presented for these two systems. Additional work at 700 degrees F and also at 500 degrees F is in progress. The second part of the report summarizes the progress in experimental development of magnesium-base alloys with low alloy additions. The primary purpose of this investigation is to obtain alloys having a favorable combination of medium strength and high formability. A major portion of the development work was devoted to a continued study of magnesium-zinc-cerium alloys. Information is presented to demonstrate that an attractive combination of mechanical properties may be obtained over a reasonably wide range of zinc and cerium concentrations. Warm rolling of sheet, followed by a stress relieving heat treatment, produced the most favorable mechanical properties. Details of two successful procedures for introducing zirconium in magnesium are described. (Author)

AD-A076 034/8 PC **A10**/MF **A01**
Battelle Memorial Inst Columbus Ohio
Literature Survey on Weld-Metal Cracking.
Technical rept.,
A. J. Williams , P. J. Rieppel , and C. B. Voldrich. Aug 52, 215p WADC-TR-52-143
Contract AF 33(038)-12619

As the initial part of an investigation for Wright Air Development Center on the causes of cracking in high-strength weld metal, a literature survey was made. Work on wrought and cast steel was included in this survey, since it is the most prolific source of information on this subject. Of the various phenomena which might be pertinent, hot tearing, hot shortness, blue brittleness, and hydrogen embrittlement appeared to be closely related to the causes of weld-metal cracking. Investigators agree that most weld-metal cracking initiates at high temperatures in the boundaries between grains for dendrites. This type of cracking is generally attributed to the presence on these boundaries of low-melting-point or 'brittle' compounds - complex sulfides, for example. Most types of low-temperature cracks in weld metal appeared to be associated with rapid cooling rates and hydrogen. As a result of this survey, the experimental program on this investigation will involve weld-metal cracking tests, studies of grain-boundary constituents which might cause crcking, preparation of special weld-metal compositions, and tests to determine the temperature at which cracking occurs. (Author)

AD-A076 035/5 PC **A03**/MF **A01**
Wright Air Development Center Wright-Patterson AFB Oh
Mechanical Properties of a New High-Strength High-Toughness General-Purpose Alloy Steel.
Technical rept.,
William E. Dirkes , Robert E. Bowman , and Edward L. Horne. Aug 52, 31p Rept no. WADC-TR-52-73

Mechanical properties of a chrome-nickel-molybdenum-vanadium general purpose medium carbon alloy steel (modified SAE 4330 plus vanadium), developed by the Republic Steel Corporation, were determined to evaluate the suitability of the steel for aircraft applications. The properties of the Republic alloy steel were compared with the properties of an alloy steel, designated as 'Hy-Tuf', and with the properties of the well established SAE 4340 general purpose alloy steel. When heat treated to the same nominal hardness and strength levels, the Republic steel had approximately the same percentages of elongation and reduction of area as the other steels. The Republic alloy steel showed superior Izod impact properties to those of Hy-Tuf and SAE 4340 alloy steels when each was heat treated to a tensile strength approximating 170,000 psi (Rockwell C39) both at room and low temperatures, but its impact properties were not as high as those for Hy-Tuf when heat treated to strength levels around 220,000 psi either at room

or low temperatures. Both the Republic alloy steel and Hy-Tuf alloy steel had impact properties superior to those of SAE 4340 alloy steel.

AD-A076 038/9 PC **A05**/MF **A01**
Cornell Aeronautical Lab Inc Buffalo N Y
Development of Low Alloy Ti-B Steels for High Temperature Service Applications.
Technical rept.,
M. A. Piekutowski. Apr 52, 79p WADC-TR-52-77
Contract W33-038-ac-21094

Conservation of strategic metals may be accomplished in the production of jet aircraft engine parts provided suitable lean alloy substitutes are made available, capable of operating at elevated temperatures. In this respect, the Ti-B type of ferritic steels have been investigated and their creep and rupture properties evaluated and improved for service temperatures in the neighborhood of 1200 degrees F. It was demonstrated, through testing the properties of a 600 pound heat of 3 Cr- 1 Mo-Ti-B sheet steel with a 2.2 Ti/C ratio, that such a composition not only could be steel mill processed satisfactorily on a semi-commercial basis, but also that 1200 degrees F rupture and creep strength properties equivalent to the Cr-Ni stainless steels, could be obtained for several hundred hours of life. A detailed investigation of this steel provided design type creep data for several conditions of heat treatment and hot rolling procedures. Other tests indicated that high hot strength properties could be retained in light gage sheet material provided surface decarburization was minimized during processing. Ceramic coated creep and rupture test specimens of this alloy displayed a life advantage over uncoated specimens at temperatures above 1200 degrees F because of protection against oxidation. Heliarc welded joints of the 3 Cr-1 Mo-Ti-B sheet steel had inferior hot rupture strength with respect to the parent metal when no filler rod was used. A reasonable approach to parent metal high temperature strengths was obtained with the use of a 347 stainless steel filler rod with the weld bead left on.

AD-A076 046/2 PC **A05**/MF **A01**
Battelle Memorial Inst Columbus Ohio
Investigation of Compressive-Creep Properties of Aluminum Columns at Elevated Temperatures. Part I.
Technical rept. 1 Feb 50-30 Sep 52,
R. L. Carlson , and A. D. Schwope. Sep 52, 78p WADC-TR-52-251-PT-1
Contract AF 33(038)-9542
See also Part 2, AD-043 524.

An experimental investigation of the behavior of 24S-T4 (stabilized) aluminum columns at three elevated temperatures has been conducted. Tests were performed on long- and short-hinged-end columns of five slenderness ratios. By using an adjustable end eccentricity, it was possible to fix the eccentricity for a column of a given slenderness ratio and thereby obtain comparable results for different loads. Deflection measurements were taken at the mid-point throughout the duration of each test, and curves of deflection versus time with load as the parameter were obtained for each slenderness ratio. Test results indicate that, for a column of a given slenderness ratio and eccentricity, there is a limiting load below which collapse due to creep will not occur. It is concluded that this lower limit should be considered the limiting or allowable load. It is suggested that an approximate method of the type introduced in the report should be employed to determine this load. (Author)

AD-A076 049/6 PC **A04**/MF **A01**
Bureau of Mines Albany Oreg
Malleable Chromium and Its Alloys.
Technical rept. 15 Sep 50-15 Sep 51,
Earl T. Hayes. Mar 52, 63p WADC-TR-52-54
Contract AF 33(038)50-1084

Improvements in production of high purity chromium metal by magnesium reduction of anhydrous chlorides and by hydrogen treatment of electrolytic chromium is reported. The arc melting of hydrogen treated chromium has been accomplished and the forging, rolling, and swaging of this arc melted material has been successful. Arc melted chromium has been forged at liquid air temperatures. X-ray and metallographic studies indicated the recrystallization temperature of rolled chromium sheet tobe about 750 degrees C. Experiments in drip melting, deoxidizing element additions, and treatment with molten calcium and calcium hydride are recorded. Brinell hot hardness values on arc melted chromium have been obtained at various temperatures up to 800 degrees C. Preliminary investigation of hot bending characteristics of rolled chromium sheet shows the minimum bending temperature to be 325 degrees C. The heat resistance of chromium has been investigated. (Author)

AD-A076 247/6 Not available NTIS
Royal Military Coll of Canada Kingston (Ontario)
The Plastic Flow Stress of Metals and Alloys in the Superconducting and Normal States,
T. S. Hutchison , and S. L. McBride. 20 May 75, 19p DRB-REPRINT-4140
Availability: Pub. in Jnl. of Low Temperature Physics, v22 n1/2 p121-139 1976 (No copies furnished by DTIC).

No abstract available.

AD-A076 320/1 MF **A01**
Boeing Wichita Co Ks
Evaluation of the Crack Gage Concept for Monitoring Aircraft Flaw Growth Potential.
Final rept. 1 Jul 77-1 Dec 78,
Gary G. Cassatt. Jun 79, 264p AFML-TR-79-4037-VOL-2
Contract F33615-77-C-5073
See also Volume 1, AD-A076 421.
Availability: Microfiche copies only.

The results of a test program to evaluate the ability of a bonded-on precracked coupon to monitor the growth of flaws in the basic structure are included. All testing utilized 7075-T651 aluminum from a single plate. Both constant thickness and stepped crack gages were evaluated. Evaluation of a wide range of sensitivity in crack gage crack growth response was made. Structure flaws of (1) corner flaw at a hole, (2) through flaw at a hole, and (3) center notch flaw were evaluated. The cyclic test loading included constant amplitude of two R ratios and three representative aircraft usage flight profiles. Strain gage instrumentation was used to measure structure stresses and load transferred into the crack gages. (Author)

ANL/CNSV-3 PC **A04**/MF **A01**
Argonne National Lab., IL.
Energy and Materials Flows in the Fabrication of Aluminum Products.
R. M. Arons, and A. M. Wolsky. Aug 78, 69p
Contract W-31-109-ENG-38

In 1977, 1.5% of all purchased fuels and electricity used by US industry was consumed in the holding, casting, melting, and production of mill products by the aluminum industry. An in-depth understanding of how that energy is used is necessary for the formulation of plans to reduce energy consumption. Similarly, assessment of the relative value of innovative energy efficient processing techniques depends upon a better understanding of current practice. This report describes the aluminum fabrication process in great detail and cites energy use and efficiency for each process step. It is concluded that the most effective approaches to energy conservation would be use of methods for waste heat reduction and recovery, reduction of scrap generation during processing, use of induction heating for both melting and heat treating, and use of alternative processing techniques that eliminate energy intensive intermediate steps. (ERA citation 04:055171)

ANL/OEPM-79-2 PC **A10**/MF **A01**
EIC Corp., Newton, MA.
Survey of Metallurgical Recycling Processes. Final Report.
J. P. Pemsler. Mar 79, 201p
Contract W-31-109-ENG-38

In the year 2000, the US will consume about 3.2 x 10 exp 15 Btu to produce the seven major nonferrous metals Al, Cu, Zn, Pb, Ni, Mg, and Ti. Of this amount, 82% will be used in the production of Al. It is projected that 0.6 x 10 exp 15 Btu will be saved by the recycle of secondary metals. Major opportunities for increasing the extent of recycle and thereby increasing the energy savings are discussed. An inherent feature in the energistics of recycle is that physical processes such as magnetic separation, density separations, melting, and in some instances vaporization are far less energy intensive than are chemical processes associated with dissolution and electrowinning. It is in the domain of scrap of complex composition and physical form, difficult to handle by existing technology, that opportunities exist for new chemical recycle technology. Recycle of scrap metal of adequate grade is currently achieved through pyrometallurgical processes which, in many cases, are not very energy intensive as compared with hydrometallurgical processes. Preliminary flowsheets are presented for the recovery of value metals from batteries considered for use in vehicular propulsion and load leveling applications. The battery types examined are lead/acid, nickel/zinc, nickel/iron, zinc/chlorine, lithium-aluminum/iron sulfide, and sodium/sulfur. A flow sheet has been outlined for an integrated hydrometallurgical process to treat low-grade copper scrap. A fully integrated hydrometallurgical process is outlined, and costs and energy consumption are derived, for recovering zinc metal from electric furnace flue dusts. Costs and energy are high and the process does not appear to warrant development at this time. Improvement in the recycle of magnesium is associated primarily with improved recycle in the Al industry where Mg is an important alloy additive. Ni and Ti recycle are associated with improved collection and sorting of stainless steel and specialty alloys. (ERA citation 04:053409)

ANL/OEPM-79-3 PC **A12**/MF **A01**
Battelle Columbus Labs., OH.
Survey of Electrochemical Metal Winning Processes. Final Report.
L. E. Vaaler. Mar 79, 260p
Contract W-31-109-ENG-38

The subject program was undertaken to find electrometallurgical technology that could be developed into energy saving commercial metal winning processes. Metals whose current production processes consume significant energy (excepting copper and aluminum) are magnesium, zinc, lead, chromium, manganese, sodium, and titanium. The technology of these metals, with the exception of titanium, was reviewed. Growth of titanium demand has been too small to justify the installation of an electrolyte process that has been developed. This fact and the uncertainty of estimates of future demand dissuaded us from reviewing titanium technology. Opportunities for developing energy saving processes were found for magnesium, zinc, lead, and sodium. Costs for R and D and demonstration plants have been estimated. It appeared that electrolytic methods for chromium and manganese cannot compete energywise or economically with the pyrometallurgical methods of producing the ferroalloys, which are satisfactory for most uses of chromium and manganese. (ERA citation 04:053405)

BNL-26391 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Superconducting Properties of (Nb,Ta) sub 3 SN Wires Fabricated by the Bronze Process.
M. Suenaga, K. Aihara, K. Kaiho, and T. S. Luhman. 1979, 19p CONF-790815-9
Contract EY-76-C-02-0016
Cryogenic engineering conference, Madison, WI, USA, 21 Aug 1979.

Measurements of the superconducting critical temperature T/sub c/, critical current density, J/sub c/ (8<H<22.5 T), and the critical magnetic field H/sub c2/ were made on bronze processed (Nb,Ta) sub 3 Sn monofilamentary wires. Ta content in the Nb sub 3 Sn compound was varied by alloying the Nb core prior to a reaction heat treatment. Core compositions were 0, 3, 7, 10, and 20 wt% Ta and heat treatments for the reaction were 16, 64, and 120 h at 725 exp 0 C. For the 120 h heat treatment T/sub c/ decreased monotonically with Ta content from 17.5 to 15.7K while H/sub c2/ increased from 19.8 to 24.6 T. With increasing Ta content J/sub c/ (16 T) increased from 0.7 x 10 exp 5 A/cm exp 2 to a maximum value of 1.3 x 10 exp 5 at 7 wt% Ta. Further increases in the Ta content produced a decrease in J/sub c/(16 T). At 10 T J/sub c/ decreased with increasing Ta content. An important aspect of this work is the observation that alloying with Ta did not hinder wire ductility during drawing. It appears therefore that the

improvements in J/sub c/(16 T) can be incorporated into commercially manufactured conductors. (ERA citation 04:051942)

CONF-790657-1 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Toward a Comprehensive Theory of Radiation-Induced Swelling and Creep - the Point Defect Concentrations.
L. K. Mansur, and M. H. Yoo. 1979, 8p
Contract W-7405-ENG-26
Conference on irradiation behavior of metallic materials for fast reactor core components, Corsica, France, 5 Jun 1979.

The theory of void swelling and irradiation creep is now fairly comprehensive. A unifying concept on which most of this understanding rests is that of the rate theory point defect concentrations. Several basic aspects of this unifying conept are reviewed. These relate to local fluctuations in point defect concentrations produced by cascades, the effects of thermal and radiation-produced divacancies, and the effects of point defect trapping. (ERA citation 04:051897)

COO-1198-1250 PC **A05**/MF **A01**
Illinois Univ. at Urbana-Champaign. Dept. of Physics.
Ultrasonic Studies of Radiation Damage in an Aluminum--Manganese Alloy.
D. L. Johnson. 1978, 92p
Contract EY-76-C-02-1198
Thesis.

The MHz internal friction technique has been shown to provide accurate measurements of the properties of defects produced by a low dose of electron radiation. In spite of the optimum conditions for avoiding complications due to multiple interstitial and multiple solute atom complexes, the multile peak structure of the data indicated that more than one defect configuration was present. This is in direct contrast with channeling measurements and the interpretation of Moessbauer effect measurements which indicated the defect trapping configuration was the <100> mixed dumbbell. Neither of the two existing models used in the interpretation of other experiments was capable of explaining the data. However, a third model incorporating the features of both is capable of accounting for the observed behavior. (ERA citation 04:051970)

COO-1198-1267 PC **A07**/MF **A01**
Illinois Univ. at Urbana-Champaign. Dept. of Physics.
Interstitial-Impurity Trapping in Al--Fe and Al--Zn.
K. L. Hultman. 1979, 147p
Contract EY-76-C-02-1198

Ultrasonic attenuation and velocity measurements were made as a function of polarization, temperature, frequency and annealing before and after electron irradiation near 65 exp 0 K of Al--Fe and Al--Zn dilute alloys. Multiple relaxation processes were observed in both alloys. In the case of Al--Zn, the simultaneous annealing near 130 exp 0 K of resistivity, diaelastic modulus changes, and a paraelastic relaxation peak in C' allows for a characterization of the individual defects. The results provide strong evidence that below 130 exp 0 K, the <100>-mixed dumbbell is the predominant interstitial trapping configuration. The temperature dependence of the relaxation peak near 4.9 exp 0 K is not that expected for a thermally activated process, but provides evidence for defect tunneling. A second trapping configuration present in low concentration anneals out near 100 exp 0 K, and probably arises from <111>-mixed defects. In Al--Fe, the observation of the diaelastic effect and a peak in the C' mode not previously seen in earlier internal friction measurements, together with an identification of this peak with the major defect species resolves the apparent contradiction between the internal friction and channeling symmetry evidence. This allows for an interpretation in terms of a <100>-mixed dumbbell which is consistent with previous theory and channeling and Moessbauer measurements. The results for Al--Fe differ greatly from those obtained earlier for Al--Mn, suggesting that current theories based only on size differences require extension. (ERA citation 04:051971)

COO-2733-17 PC **A03**/MF **A01**
Cornell Univ., Ithaca, NY. Dept. of Theoretical and Applied Mechanics.
Elongation Upon Torsion in a Theory for the Inelastic Behavior of Metals.
W. E. Van Arsdale, E. W. Hart, and J. T. Jenkins. Nov 78, 32p
Contract EY-76-S-02-2733

The torsion of a thin-walled cylinder is studied using the low temperature or visco-plastic limit of Hart's state variable theory for the inelastic behavior of metals. For values of the shear stress lower than the hardness of the material, reversible elongation is found to accompany the recoverable twist. For shear stress exceeding the hardness, there are, in addition, a permanent twist and elongation. These predictions agree qualitatively with existing experiments. Detailed quantitative results, for several loading histories, are obtained for Nickel. (ERA citation 04:051926)

COO-2733-19 PC **A03**/MF **A01**
Cornell Univ., Ithaca, NY. Dept. of Theoretical and Applied Mechanics.
Thermoviscoplastic Response of Cylindrical Structures Using a State Variable Model.
S. Mukherjee. Feb 79, 27p
Contract EY-76-S-02-2733

A number of combined creep-plasticity constitutive models with state variables have been recently proposed to describe time-dependent inelastic deformation of metals at elevated temperatures. Some of these models seem capable of more faithfully predicting material behavior under complex mechanical and thermal loading histories than is currently possible with traditional models which use separation of time-independent plasticity and time-dependent creep. For some time interest in the efficient numerical solution of boundary value problems using constitutive models was shown. A particularly promising model was used in the calculations. This model has been used to predict the uniaxial responses of several metals and alloys to various types of loading histories. The correlation between model predictions and experiments was found to be very good. Stresses and deformation in cylindrical structures subjected to time-dependent axisymmetric mechanical and thermal loads was studied. Several physically observed phenomena that cannot be simulated by traditional models are discussed. The computational scheme used is very efficient. (ERA citation 04:051927)

COO-2733-20 PC **A03**/MF **A01**
Cornell Univ., Ithaca, NY. Dept. of Theoretical and Applied Mechanics.
Improved Boundary-Integral Equation Method for Time-Dependent Inelastic Deformation in Metals.
M. Morjaria, and S. Mukherjee. Feb 79, 31p
Contract EY-76-S-02-2733

Efficient solution of boundary-value problems for time-dependent inelastic deformation in metallic structures are generally solved by finite element methods and separate descriptions for time-independent plasticity and time-dependent creep are normally used. The boundary-integral equation method was recently applied for the first time to such problems. A very efficient numerical implementation of the method with a linear description of the relevant variables over each boundary element and a newly developed Euler type time-integration scheme with automatic time-step control for time integration is presented. Numerical results for plates in plane stress with and without cutouts, under different loading histories, are presented. A combined creep-plasticity constitutive theory with state variables is used to model material behavior. The results are more accurate and are obtained with much less computational effort compared to a previous attempt with an uniform description of variables over each boundary element and a predictor--corrector scheme for time-integration. The computer program developed is quite general and can handle plane stress problems for plates of arbitrary shapes subjected to arbitrary time-histories of loadings. The numerical results presented in the paper are for certain illustrative problems. (ERA citation 04:051928)

COO-3084-68 PC **A02**/MF **A01**
Brown Univ., Providence, RI. Div. of Engineering.
Approximate Method for the Estimate of the Contribution of Load Transfer to the Internal Stress in Dispersed Particles.
J. Gurland. Jun 79, 4p
Contract EY-76-S-02-3084

The derivation of an approximate expression for the contribution of load transfer to the internal stress in hard particles dispersed in a plastic matrix is a part of a theoretical model, for structural phase continuity and its effect on the yield strength of two-phase alloys. This elaboration and expansion of one aspect of the model will first define the pertinent average geometric characterization of the particles and then consider the average stress in a representative particle of average dimensions. (ERA citation 04:052005)

COO-3084-69 PC **A04**/MF **A01**
Brown Univ., Providence, RI. Div. of Engineering.
Combined Macroscopic and Microscopic Approach to the Fracture of Metals. Technical Progress Report.
R. J. Asaro, J. Gurland, A. Needleman, and R. J. Rice. Jun 79, 58p
Contract EY-76-S-02-3084

Progress is reported on microscopic fracture mechanisms, including studies of void and crack initiation in steels in the absence and presence of hydrogen, the effects of hydrogen on ductile fracture in medium and high carbon steels; elastic--plastic crack growth including the quasi-stable growth of cracks in ductile solids under increasing load and conditions of instability; and elevated temperature rupture including analysis of the stress field near a crack tip in an elastic-nonlinear viscous material under tensile load as well as the processes of diffusion, and cavitation of grain boundaries in plastically creeping materials. (ERA citation 04:051930)

COO-3158-61 PC **A03**/MF **A01**
Cornell Univ., Ithaca, NY. Dept. of Materials Science and Engineering.
In-Situ Field--Ion Microscope Study of the Recovery Behavior of Ion-Irradiated Tungsten and Tungsten Alloys.
K. L. Wilson, M. I. Baskes, and D. N. Seidman. Apr 79, 40p
Contract EY-76-S-02-3158

Five grades of W specimens with different purity levels were irradiated to a dose of typicaly 5 x 10 exp 12 ion cm exp -2 at 18 exp 0 K. Examination with a low-temperature field-ion microscope showed the isochronal-annealing spectra of the specimens to result from a large self-interstitial atom (SIA) flux at approx. 38 exp 0 K, followed by significant SIA flux from approx. 50 to 80 exp 0 K and a small amount of additional recovery up to 120 exp 0 K. The spectra for these specimens were essentially identical between 18 and 120 exp 0 K. High-purity W specimens doped with C showed only a small reduction in the amount of recovery observed for the long-range migration peak at 38 exp 0 K. The isochronal recovery spectra for W-Re specimens were different from the isochronal recovery spectra of pure W specimens. For both alloys the recovery of the Stage I long-range migration peak at 38 exp 0 K was strongly suppressed. All recovery from 18 to 120 exp 0 K was virtually eliminated indicating that during the long-range migration substage at 38 exp 0 K tightly-bound, immobile SIA-Re complexes were formed that suppressed the SIA--SIA reaction. This effect was observed at high Re atom concentrations. The lack of any significant differences for the annealing spectra of the five purity-levels of undoped W and the appearance of impurity effects in the extremely concentrated alloys indicated that the early Stage II recovery observed in the annealing spectra of self-ion irradiated high-purity W was intrinsic. Because of the highly inhomogeneous SIA distribution of the W exp + ion damage, the SIA--SIA interaction during Stage I long-range migration at 38 exp 0 K appeared to be the dominant trapping mechanism. The early Stage II SIA recovery was attributed to the migration or dissolution of these SIA clusters. (ERA citation 04:051972)

COO-3459-14 PC **A02**/MF **A01**
Rensselaer Polytechnic Inst., Troy, NY.
Fatigue and Delayed Failure of Refractory Metals. Annual Report.
N. S. Stoloff. 15 Jan 79, 22p

Contract EY-76-S-02-3459

Research is reported concerning delayed failure and fatigue behavior of polycrystalline vanadium and niobium and their alloys with hydrogen including delayed failure of Nb--H alloys, effect of temperature on fatigue life in vacuum, and crack propagation vs stress intensity. Previously reported results on delayed failure of hydrided vanadium are reviewed with attention to details of the fracture process. A review is presented concerning mechanical properties of candidate first wall materials indicating the importance of fatigue and creep. (ERA citation 04:051931)

COO-4072-2 PC **A03**/MF **A01**
Drexel Univ., Philadelphia, PA. Dept. of Materials Engineering.
Strain Hardening and Ductility of Iron: Axisymmetric Vs. Plane Strain Elongation. Technical Progress Report.
G. Langford. May 79, 37p
Contract EY-76-S-02-4072

The strain hardening of iron at high strains in plane strain elongation (strip drawing) is shown to fall increasngly below that of drawn iron wires at true strains above 2. This makes it unnecessary to invoke shear band formation simultaneously as a strengthening mechanism and as a ductility reducing mechanism in the drawn strip. Rather, shear bands may be a weakening mechanism in all contexts. A set of specimens of interstitial-free iron deformed in three of the four main classifications of deformation symmetry (wire, strip, and chips, representing axisymmetric elongation, plane strain elongation, and pure shear) has been prepared in the form of mechanical test specimens and thin foils for high resolution selected area diffraction. A simple technique for rapid discovery of the <110> axis of foils of strongly textured bcc wire has been worked out. (ERA citation 04:051932)

COO-4246-8 PC **A03**/MF **A01**
Notre Dame Univ., IN. Dept. of Metallurgical Engineering and Materials Science.
Microstructural Effects in Abrasive Wear. Quarterly Progress Report, December 15, 1978--March 15, 1979.
N. F. Fiore, T. H. Kosel, W. Konkel, and J. Fulcher. 15 Apr 79, 44p
Contract EF-77-S-02-4246

An understanding is sought of the relationships between low-stress and gouging wear resistance and microstructure of a series of Ni--Cr white irons and Co-base powder metallurgy (PM) alloys. Time wear testing, optical and quantitative metallography (QTM), and scanning electron microscopy (SEM) have been completed. The wear-microstructure interactions of Ni--Cr iron (Ni-Hard 4) samples having various volume fractions of retained austenite are discussed. The results of detailed SEM studies are considered along with micro-quantitative analyses of the wear scars by energy-dispersive x-ray spectroscopy (EDXS), to provide interpretation of the wear behavior in terms of material removal micro-mechanisms in the white irons. (ERA citation 04:051912)

HEDL-SA-1656 PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Develop of the Climb Induced Glide Concept to Describe in-Reactor Creep of FCC Materials.
B. A. Chin, J. L. Straalsund, and E. R. Gilbert. May 79, 21p CONF-790555-3
Contract EY-76-C-14-2170
International conference on fundamental mechanisms of radiation-Induced creep and growth, Chalk River, Canada, 8 May 1979.

The Climb Induced Glide model (CIG) for irradiation creep is developed using a plastic flow law which has been successfully applied in the correlation of Type 316 stainless steel rupture data. This model is used to predict the stress and temperature dependence of irradiation creep and the transition from irradiation to thermal creep. The predictions of this model are compared and found to be qualitatively consistent with experimental data and microstructural information. This model allows prediction of deformation behavior covering strain rates from 1 x 10 exp -13 sec exp -1 to 1 sec exp -1 . (ERA citation 04:051977)

HEDL-SA-1689 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge.
Martensitic Transformation in High Magnetic Fields.
M. K. Korenko, and M. Cohen. Apr 79, 7p CONF-7906116-1
Contract EY-76-C-14-2170
ICOMAT-79 conference, Cambridge, MA, USA, Jun 1979.

The kinetics of the isothermal martensitic transformation in Fe--29.6 Ni and Fe--22.5 Ni--4 Mn alloys were investigated as a function of constant magnetic fields, ranging up to 140 KOe (11 x 10 exp 6 ampere/m). The principal role of the applied magnetic field is to increase the free-energy difference between the product and parent phases in these iron-based alloys, and so the transformational driving force for a given composition can be varied even at a fixed temperature. In the Fe--Ni alloy, the isothermal transformation rate is increased by raising the magnetic field as well as by lowering the temperature, leading in either case to the entre of burst characteristics. The Fe--Ni--Mn alloy does not transform perceptibly without an applied field, but exhibits isothermal C-curve kinetics in fields above 60 KOe (4.8 x 10 exp 6 ampere/m). The average volume per martensitic plate ad the average plate orientation are found to be insensitive to the strength and direction of the magnetic field, undoubtedly indicating the dominance of autocatalytic nucleation during the course of the isothermal transformation. However, there is some tendency for the morphology to become less lath-like and more plate-like with increasing field strength at a given transformation temperature, and likewise with increasing temperature at a given driving force. Evidently, the prevailing view that martensite becomes more plate-like with decreasing transformation temperature is a consequence of the attendant increase in driving force rather than a pure thermal effect. Nucleation rate measurements have also been carried out as a function of temperature and magnetic-field strength. In testing nucleation models against these results, it is necessary to take into account the effects of magnetic field, as well as of temperature, on the elastic constants. (ERA citation 04:051913)

HEDL-SA-1750 PC **A03**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Fatigue-Crack Propagation Response of Two Nickel-Base Alloys in a Liquid Sodium Environment.
W. J. Mills, and L. A. James. 23 Jan 79, 31p CONF-790615-20
Contract EY-76-C-14-2170
US national congress on pressure vessels and piping, San Francisco, CA, USA, 25 Jun 1979.

The elevated temperature fatigue-crack propagation response of Inconel 600 and Inconel 718 was characterized within a linear-elastic fracture mechanics framework in air and low-oxygen liquid sodium environments. The crack growth rates of both nickel-base alloys tested in liquid sodium were found to be considerably lower than those obtained in air. This enhanced fatigue resistance in sodium was attributed to the very low oxygen content in the inert sodium environment. Electron fractographic examination of the Inconel 600 and Inconel 718 fatigue fracture surfaces revealed that operative crack growth mechanisms were dependent on the prevailing stress intensity level. Under low growth rate conditions, Inconel 600 and Inconel 718 fracture surfaces exhibited a faceted, crystallographic morphology in both air and sodium environments. In the higher growth rate regime, fatigue striations were observed; however, striations formed in sodium were rather ill-defined. These indistinct striations were attributed to the absence of oxygen in the liquid sodium environment. Striation spacing measurements were found to be in excellent agreement with macroscopic growth rates in both environments. (ERA citation 04:051934)

HEDL-6475 PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Heavy Section Steel Technology Program: Irradiation Effects on the Fracture Toughness of Heavy Section Pressure Vessel Steels. Quarterly Progress Report for Period Ending February 28, 1979.
K. W. Carlson, and J. A. Williams. 9 Mar 79, 12p
Contract EY-76-C-14-2170

The extensometry study was completed and the results compiled. This study defined the accuracy and capability of the LVDT and clip gage extensometers used in the J-integral studies. This investigation led to some extensometry improvements and the establishment of test-ready conditions and procedures for J-integral tests using the unloading compliance method. Using these established procedures, the a/w-facegroove matrix specimens were successfully tested. (ERA citation 04:051556)

LBL-9103 PC **A04**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Effects of Air Melting on Fe/0.3/3Cr/0.5Mo/2Mn and Fe/0.3C/3Cr/0.5Mo/2Ni Structural Alloy Steels.
B. Steinberg. Jun 79, 53p
Contract W-7405-ENG-48
Thesis.

Changing production methods of a steel from vacuum melting to air melting can cause an increase in secondary particles, such as oxides and nitrides, which may have detrimental effects on the mechanical properties and microstructure of the alloy. In the present study a base alloy of Fe/0.3C/3Cr/0.5Mo with either 2Mn or 2Ni added was produced by air melting and its mechanical properties and microstructure were compared to an identical vacuum melted steel. Significant differences in mechanical behavior, morphology, and volume fraction of undissolved inclusions have been observed as a function of composition following air melting. For the alloy containing manganese, all properties remained very close to vacuum melted values but the 2Ni alloy displayed a marked loss in Charpy impact toughness and plane strain fracture toughness. This loss is attributed to an increase in volume fraction of secondary particles in the nickel alloy, as opposed to both the Mn alloy and vacuum melted alloys, as well as to substaintially increased incidence of linear coalescence of voids. Microstructural features are discussed. (ERA citation 04:048892)

LBL-9208 PC **A06**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Precipitation Hardening in Fe--Ni Base Austenitic Alloys.
K. M. Chang. May 79, 107p
Contract W-7405-ENG-48
Thesis.

The precipitation of metastable Ni sub 3 X phases in the austenitic Fe--Ni-base alloys has been investigated by using various combinations of hardening elements, including Ti, Ta, Al, and Nb. The theoretical background on the formation of transition precipitates has been summarized based on: atomic size, compressibility, and electron/atom ratio. A model is proposed from an analysis of static concentration waves ordering the fcc lattice. Ordered structure of metastable precipitates will change from the triangularly ordered gamma ', to the rectangularly ordered gamma '', as the atomic ratio (Ti + Al)/(Ta + Nb) decreases. The concurrent precipitation of gamma ' and gamma '' occurs at 750 exp 0 C when the ratio is between 1.5 and 1.9. Aging behavior was studied over the temperature range of 500 exp 0 C to 900 exp 0 C. Typical hardness curves show a substantial hardening effect due to precipitation. A combination of strength and fracture toughness can be developed by employing double aging techniques. The growth of these coherent intermediate precipitates follows the power law with the aging time t : t/sup 1/3/ for the spherical gamma ' particles; and t/sup 1/2/ for the disc-shaped gamma ''. The equilibrium beta phase is observed to be able to nucleate on the surface of imbedded carbides. The addition of 5 wt % Cr to the age-hardened alloys provides a nonmagnetic austenite which is stable against the formation of mechanically induced martensite.Cr addition retards aging kinetics of the precipitation reactions, and suppresses intergranular embrittlement caused by the high temperature solution anneal. The aging kinetics are also found to be influenced by solution annealing treatments. (ERA citation 04:046947)

LBL-9260 PC **A05**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.

Alloying and Heat Treatment Optimization of Fe/Cr/C Steels for Improved Mechanical Properties.
M. Sarikaya. Jun 79, 89p
Contract W-7405-ENG-48
Thesis.

The effects of alloying elements and heat treatments on the microstructural changes and strength-toughness properties were investigated in optimization of vacuum melted Fe/Cr/C base steels. The structure of the steels in the as-quenched conditions consisted of highly dislocated autotempered lath martensite (strong phase) and thin continuous interlath films of retained austenite (tough phase). It has been emphasized again that the mechanical properties of the steels are sensitive to the amount and the stability of retained austenite. To increase the stability of retained austenite in the as-quenched condition 2 w/o Mn or 2 w/o Ni was added to the base steel, viz., Fe/3Cr/0.3C. Partial replacement of Cr by about 0.5 w/o Mo did not alter the beneficial microstructure. (ERA citation 04:051935)

NUREG/CR-0859 PC **A03**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Ductile Fracture Toughness of Heavy Section Pressure Vessel Steel Plate: A Specimen-Size Study of ASTM A 533 Steels.
Topical rept.,
J. A. Williams. Sep 79, 48p HEDL/TME-77/1
Contract DE-AC14-76FFO2170

The ductile fracture toughness, J sub Ic, of ASTM A 533, Grade B, Class 1 and ASTM A 533, heat treated to simulate irradiation, was determined for 10- 100-mm thick compact specimens. The toughness at maximum specimen load was also measured to determine the conservatism of J sub Ic. The toughness of ASTM A 533, Grade B, Class 1 steel was 349 kJ/sq m and at the equivalent upper shelf temperature, the heat treated material exhibited 87 kJ/sq m. The maximum load fracture toughness was found to be linearly proportional to specimen size, and only specimens which failed to meet ASTM size criteria exhibited maximum load toughness less than J sub Ic.

N80-10511/7 PC **A02**/MF **A01**
Laboratorium fuer Betriebsfestigkeit, Darmstadt (Germany, F.R.).
Constant and Variable Loading Fatigue Strength of Black-Heart Malleable Cast Iron Regarding Metallurgical Characteristics.
H. Ostermann, H. Rueckert, and A. Engels. 31 Jan 79, 14p ICAF-1089
Rean-Repr. From Giessereiforschung (Dusseldorf), Vol. 1, 31 Jan. 1979 p 25-36.
In German; English Summary.

Fatigue tests were carried out on axial loaded notched specimens made from black-heart malleable cast iron covering the range from 350 to 700 N/sq mm ultimate tensile strength. Within this range three alloys were produced according to the German specification GTS 35, GTS 55 and GTS 70; three foundries with two different melting heats which were included. The machined test bars with a final cross section of 40 x 5 mm were notched corresponding to the stress concentration factors K = 2,0 and 3,6 and in the fatigue tests subjected to axial loading with stress ratios of R = 0. For each combination of type of material and testing parameters K and R statistical data from S-N tests and 8 stepped program tests were obtained. A relation between the observed differences in fatigue properties dependent on casting and annealing techniques and some typical metallurgical characteristics so as number, shape and extension of temper-carbon nodules is presented.

PAT-APPL-6-051 780 PC **A02**/MF **A01**
Department of the Army Washington DC
Multilayer Laminate of Improved Resistance to Fatigue Cracking and Method for Producing Same.
Patent Application,
Joseph F. Throop. Filed 25 Jun 79, 14p AD-D006 409/7
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A multilayer bi-metallic laminate of improved resistance to the initiator and propagation of fatigue cracking and fracture is obtained by intimately bonding, alternate sheets of the two metals one of the metals having a modulus of elasticity at least 20% greater than the othe metal. Prior to the bonding step the sheets of the stronger metal are stretched so that when they are released after the bonding step they are left in a state of residual tension while the sheets of the weaker metal are left in a state of residual compression. The residual compression in the weaker metal inhibits fatigue cracking of the laminate while the residual tension in the stronger metal has little effect on the crack resistance thereof. (Author)

PB80-104185 Not available NTIS
National Bureau of Standards, Washington, DC.
On Diffusional Mass Transport in Polycrystals Containing Stationary or Migrating Grain Boundaries.
Final rept.,
J. W. Cahn, and R. W. Balluffi. 1979, 4p
Sponsored in part by Department of Energy, Washington, DC., and National Science Foundation, Washington, DC.
Pub. in Scripta Metallurgica 13, n6, p499-502 1979.

Mass transport in polycrystalline materials is classified according to whether grain boundaries are stationary or not, whether there is time for lattice diffusion, and whether there is time for multiple interactions between diffusing species and grain boundaries.

PB80-104433 Not available NTIS
National Bureau of Standards, Washington, DC.
Corrosion Induced by an Alternating Voltage. A Comparison Between Theoretical Predictions and Experimental Results.
Final rept.,
U. Bertocci, and J. L. Mullen. 1979, 11p
Contract E(49-1)-3800
Pub. in Corrosion/79, Paper 242, p242/1-242/11 1979.

After summarizing the theoretical predictions for the current response to an alternating voltage of an electrode under charge-transfer control, the experimental results obtained for the hydrogen evolution reaction on a copper electrode are reported. The results show that the current-potential curves obtained for the d.c. component of the current as well as some of the harmonic components of the peridic current are in good agreement with the values calculated from the theoretical model. The predictions concerning the effect of varying the modulating signal amplitude and frequency are also verified experimentally. The experimental results begin to deviate from the predicted ones when the amplitude exceeds the potential range where only charge-transfer is significant, and when the ohmic drop resistance becomes large with respect to the other circuit elements.

PB80-104458 Not available NTIS
National Bureau of Standards, Washington, DC.
Diffusion Induced Grain Boundary Migration.
Final rept.,
J. W. Cahn, J. D. Pan, and R. W. Balluffi. 1979, 7p
Sponsored in part by Scripta Metallurgica 13, n6, p503-509 1979.

Diffusion induced grain boundary migration had been observed in three systems. The results in three additional systems are reported, suggesting that this may be a widespread phenomenon for low temperature diffusion. The theoretical problems posed by the observations are discussed.

PB80-801137 PC **N01**/MF **N01**
New Mexico Univ., Albuquerque. Technology Application Center.
Corrosion Characteristics of Aluminum Alloys (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1973-Nov 79,
Gerald F. Zollars. Nov 79, 40p
Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography of citations to articles from the international literature concerns the corrosion characteristics of aluminum alloys. Included are articles dealing with corrosion resistance, stress corrosion cracking, intergranular corrosion, electrochemical corrosion, corrosion prevention, and corrosion and fatigue tests of aluminum alloys. (Contains 162 citations)

PB80-801467 PC **N01**/MF **N01**
New Mexico Univ., Albuquerque. Technology Application Center.
Corrosion Characteristics of Titanium Alloys (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1973-Nov 79,
Gerald F. Zollars. Dec 79, 32p
Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography of citations to articles from the international literature concerns the corrosion characteristics of titanium alloys. Included are articles dealing with corrosion resistance, electrochemical corrosion, stress corrosion cracking, and corrosion tests of titanium alloys. (Contains 126 citations)

UCRL-15021 PC **A02**/MF **A01**
California Univ., Los Angeles.
Summary of Work Done Pursuant to Purchase Order No. 3268909.
G. C. Kennedy, J. Ramakrishnan, R. Boehler, and R. Grover. 1979, 8p
Contract W-7405-ENG-48

The personnel service contract supporting experimental measurements of the dT/dP in liquid metals and alloys of interest to theoretical physical property programs at LLL is summarized. NaK sub 2 measurements, and the adiabatic pressure derivative of temperature (dT/dP)s of lead up to 25 kbar and 500 exp 0 C are reported. (ERA citation 04:046989)

11H. Oils, Lubricants, and Hydraulic Fluids

AD-A075 879/7 MF **A01**
Armour Research Foundation Chicago Il
Studies to Determine the Electrical and Physical Properties of Aircraft Lubricating Oils.
Technical rept.,
Joseph L. Radnik. Sep 52, 161p WADC-TR-52-220
Contract AF 33(038)-3793
Availability: Microfiche copies only.

A study was made of various grades of aircraft lubricating oils to assist in evaluating the capacitance type fuel quantity gage for use with oils. Measurements of dielectric constant, dissipation factor, and density were made on 144 new and used specimens of aircraft lubricating oils of grades 1100, 1080, 1065, 1010 and 1005 under the influence of changing frequency and temperature. Special studies were made to determine the effects of dilution with aviation fuel, the effect of additive compounds, and the effect of oil clinging to the sides of the sensing element of the gage. Used oil specimens were found to have substantially higher dielectric constants and dissipation factors than the corresponding new oil specimens. Dissipation factors as high as 5.020 were detected in some used specimens. Addition of various additive compounds to a base oil produced a significant change in the dielectric properties of the mixture.

AD-A076 037/1 PC **A05**/MF **A01**
Southwest Research Inst San Antonio Tex
Development of Test Methods for Antiseize Compounds.
Technical rept.,
John W. Cunningham. Sep 52, 97p WADC-TR-52-102
Contract AF 33(038)-22805

The seizure of threaded connections and other tight fits was found to result from galling of the contacting surfaces. A quantitative method was developed for measuring the galling characteristics of standard metal surfaces under controlled conditions. Anti-seize compounds can be evaluated by observing their effect on these measured characteristics. A seizure tester was designed and con-

structed which automatically records galling test data and can be used for rapid routing testing. Metal specimens which are used with this machine can be: (1) assembled with an anti-seize compound between the test surfaces, (2) exposed to conditions simulating specific applications, and then (3) tested for seizure. The results of seizure tests made with several commercial anti-seize compounds are included. A preliminary correlation was obtained between these testing procedures and other performance ratings. It is concluded that this basic test method can be used to evaluate anti-seize compounds for: (1) High temperature service (1200 - 2000 F), (2) Aircraft oxygen system service, (3) Liquid oxygen system service, and (4) Similar specific applications. (Author)

AD-A076 239/3 PC **A02**/MF **A01**
Florida Univ Gainesville Dept of Chemistry
A Comparative Study of Standards for Determinations of Trace Wear Metals in Jet Engine Oils,
T. M. Tuell , A. H. Ullman , B. D. Pollard , A. Massoumi , and J. D. Bradshaw. 5 Jan 79, 7p
AFOSR-TR-79-1023
Contract F44620-76-C-0005
Pub. in Analytica Chimica Acta, v108 p351-356 1979.

No abstract available.

PAT-APPL-6-044 898 PC **A02**/MF **A01**
Department of the Army Washington DC
Apparatus for Measuring Anti-Wear Properties of Pressurized Liquids.
Patent Application,
A. Mertwoy. Filed 4 Jun 79, 14p AD-D006 405/5
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A testing device for determining the lubrication properties of hydraulic fluids under elevated pressures and temperatures comprises a pressure-tight housing defining a central cavity including a continuous passageway for the fluid, a chuck assembly located within the cavity which holds a plurality of test balls in fixed position, rotatable support structure securing an upper ball in centrally disposed contact with the test balls, and a screw-threaded adjustment adapted to move the chuck assembly to apply pressure between the test balls and the upper ball. The present testing device is of simple and inexpensive construction and reduced size and provides data respecting the test fluids which accurately reflects actual working conditions. (Author)

11I. Plastics

AD-A075 647/8 Not available NTIS
Toronto Univ (Ontario) Dept of Chemistry
The Monomer tert-Butyl p-Vinylperbenzoate (TBVP): Free-Radical Polymerization, Cross-linking, and Grafting,
A. I. Dalton , and Thomas T. Tidwell. 28 May 74, 4p
Availability: Pub. in Jnl. of Polymer Science: Polymer Chemistry Edition, v12 p2957-2960 1974 (No copies furnished by DTIC).

No abstract available.

AD-A075 958/9 PC **A02**/MF **A01**
Oklahoma Univ Norman Dept of Chemistry
Variable Temperature 119m Sn Moessbauer Study of Organotin - Substituted Styrene Monomers and Polymers.
Technical rept.,
K. C. Molloy , J. J. Zuckerman , H. Schumann , and G. Rodewald. 1 Oct 79, 8p Rept no. TR-13
Contract N00014-77-C-0432

Variable temperatire (119m)Sn Moessbauer spectroscopy can detect the enhanced binding of the tin atom in organotin (IV)-substituted styrenes on polymerization. (Author)

AD-A075 982/9 PC **A03**/MF **A01**
Cincinnati Testing and Research Labs OH
Development of High-Strength, Heat-Resistant Phenolic Laminating Resin.
Technical rept.,
M. N. Korelitz. Jul 52, 36p WADC-TR-52-161
Contract W-33-038-ac-21090

The development of a high temperature resistant glass base phenolic laminate is described. Flexural ultimate strength values of the laminate with 181-114 glass fabric at 500 degrees F after one-half hour at 500 degrees F pressed at 15-35 psi pressure average 40,000 psi. This is for 1/8 in. thick laminates up to 36 in. x 36 in., the larger size panels being bag molded. On these panels bag molded by North American Aviation, values of 35,000-45,000 psi were obtained at elevated temperatures. The higher values for bag molded panels have been obtained on 36 in. x 36 in. direct compression panels by they have not been obtained consistently to date. On direct compression panels 36 in. x 36 in. values from 25,000-30,000 psi have been obtained consistently at 500 degrees F after 1/2 hr at 500 degrees F. Values up to 55,000 psi can be obtained consistently for small laminates (such as those used in experimental compressor blades for jet engines) made at pressures in the range of 200-300 psi. Initially these large panels 18 in. x 18 in. x 1/8 in., and 36 in. x 36 in. x 1/8 in., when handled in the same manner as 6 in. x 6 in. x 1/8 in. panels, resulted in sheets with deteriorated surfaces and lowered flexural strength at elevated temperatures, (20-25,000 psi). Since the material is applicable where larger sections with good high temperature resistance is necessary, work was continued in attempting to make satisfactory large panels.

AD-A075 995/1 PC **A03**/MF **A01**
Battelle Memorial Inst Columbus Ohio
Elevated- and Room-Temperature Properties of Transparent Acrylic Sheet Materials.
Technical rept.,
John Van Echo , Gale R. Remely , and Ward F. Simmons. Feb 52, 42p WADC-TR-52-38
Contract AF 33(038)-10818

Two regular grades of transparent acrylic sheet, Plexiglas Ia and Lucite HC-201, and two heat-resistant grades, Lucite HC-202 and Plexiglas II, were tested in tensile creep and creep rupture, crazing, short-time tensile, and deterioration at room temperature, 160 and 200 F. The creep and creep-rupture tests indicated that the heat-resistant variety was considerably stronger than the regular grade, even at room temperature. At 160 and 200 F the superiority of the heat-resistant grade was much greater. At 200 F the regular acrylate sheet did not have any practicl load-carrying ability. The heat-resistant material was also much superior to the regular acrylate sheet in resistance to crazing at elevated temperatures. A linear relationship exists between temperature and stress for incipient crazing in the heat-resistant acrylate over the temperature range of this investigation. The stress to produce crazing decreased about 15 psi for each degree increased in temperature. (Author)

AD-A076 008/2 PC **A03**/MF **A01**
Naval Surface Weapons Center White Oak Lab Silver Spring Md
Moisture Sorption and Diffusion in Hercules 3501-6 Epoxy Resin.
Progress rept. Oct 77-Oct 78,
Joseph M. Augl. 30 Mar 79, 41p Rept no. NSWC/TR-79-39

The objective of this work was to obtain the moisture sorption equilibria of Hercules 3501-6 epoxy resin and its concentration dependent moisture diffusion coefficient. These data are necessary for predicting changes in aircraft strucctural composites properties where this resin is used as a matrix material. The data were obtained by sorption measurements with a Cahn electrobalance. It was found that the diffusion coefficient is strongly concentration-dependent at low moisture concentration, however, it is fairly flat at moisture concentrations corresponding to equilibrium concentration between 30 to 80 percent relative humidity. (Author)

AD-A076 047/0 PC **A03**/MF **A01**
Battelle Memorial Inst Columbus Ohio
Elevated- and Room-Temperature Properties of Selectron 44 and 5105XP Transparent Plastic Sheet Materials.
Technical rept.,
John VanEcho , Gale R. Remely , and Ward F. Simmons. Nov 52, 30p WADC-TR-52-292
Contract AF 33(038)-10818

Two transparent plastic sheet materials, Selectron 44, a polyester, and 5105XP, an acrylate, were tested in tensile creep and creep rupture, crazing, short-time tensile, and deterioration at 80 degrees, 160 degrees, and 200 degrees F. Additional short-time tensile tests were made at 250 degrees, and 300 degrees F. The creep and creep-rupture tests indicated that the 5105XP material had considerably more strength than Slectron 44 at all three tests temperatures. The short-time tensile tests have a similar indication at 80 degrees, 160 degrees, and 200 degrees F, but at 250 degrees F Selectron 44 appeared to have a slight superiority in strength. At 300 degrees F, 5105XP had no practical load-carrying ability at all, while Selectron 44 showed a tensile strength of only 204 psi. Selectron 44 displayed no crazing whatsoever at any temperature or strain rate. The crazing strength of 5105XP was, in general, equal to or greater than the rupture strength of Selectron 44 at all three test temperatures. (Author)

AD-A076 310/2 PC **A03**/MF **A01**
Construction Engineering Research Lab (Army) Champaign Il
Investigation of Rapidly Deployable Plastic Foam Systems. Volume II. Nonlinear Deformation and Local Buckling of Keviar Fabric/Polyurethane Foam Composites.
Final rept.,
Alvin Smith , S. S. Wang , and A. Y. Kuo. Oct 79, 49p Rept no. CERL-TR-M-272-VOL-2
Contracts MIPR-FY1456-78-00006, MIPR-FY1456-79-00002
See also Volume 1, AD-A076 332.

Volume I of this report (1) presents the findings of a study conducted to develop a low-density polyurethane foam system that is deployable within 5 seconds, and (2) documents a study of foam/fabric cylinders as potential structural members. An especially fast-reacting foam formulation was devised, hardware for delivery and mixing of foam chemicals was designed and evaluated, various geometric shapes of constant volume that the foam could be formed into were invesigated, and the impact loading characteristics of the foam at various times soon after generation were studied. Fabrication of fabric foam cylinders was also studied. Volume II of this report documents a study of fabric-skinned, foam-filled cylindrical beams and an analytical/experimental study of their bending properties. Results of the studies show that a low-density polyurethane foam system that will deploy within 5 seconds is practical to generate and to form into geometrically shaped lightweight fabric bags. The foam exhibits good impact absorption properties very quickly after formation; these properties can be used to attenuate rapidly applied loads of low to intermediate velocities. Finally, the fabric/foam composite beams possess interesting structural qualities commensurate with the fabric and foam used in making them. The analytical and experimental results compare very well. The analysis identified several factors of the mechanics involved that must be included in calculations to predict the loading response of such composites. (Author)

AD-A076 332/6 PC **A03**/MF **A01**
Construction Engineering Research Lab (Army) Champaign Il
Investigation of Rapidly Deployable Plastic Foam Systems. Volume I. System Development.
Final rept.,
Alvin Smith. Oct 79, 41p Rept no. CERL-TR-M-272-VOL-1
Contracts MIPR-FY1456-78-00006, MIPR-FY1456-79-00002
See also Volume 2, AD-A076 310.

Volume I of this report (1) presents the findings of a study conducted to develop a low-density polyurethane foam system that is deployable within 5 seconds, and (2) documents a study of foam/fabric deployable shapes. An especially fast-reacting foam formulation was devised, hardware for delivery and mixing of foam chemicals was designed and evaluated, various geometric shapes of constant volume that the foam could be formed into were investigated, and the impact loading characteristics of the foam at various times soon

after generation were studied. Fabrication of fabric foam cylinders was also studied. Volume II documents a study of fabric-skinned, foam-filled cylindrical beams and an analytical/experimental study of their bending properties. Results of the studies show that a low-density polyurethane foam system that will deploy within 5 seconds is practical to generate and to form into geometrically shaped lightweight fabric bags. The foam exhibits good impact absorption properties very quickly after formation; these properties can be used to attenuate rapidly applied loads of low to intermediate velocities. Finally, the fabric/foam composite beams posses interesting structural qualities commensurate with the fabric and foam used in making them. The analytical and experimental results compare very well. The analysis identified several factors of the mechanics involved that must be included in calculations to predict the loading response of such composites. (Author)

PAT-APPL-6-069 034 PC **A02**/MF **A01**
Department of the Army Washington DC
Novel Aqueous Foam Formulation and Method.
Patent Application,
Harry A. Brown, Jr. Filed 23 Aug 79, 14p AD-D006 412/1
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The invention relates to a new, stable high-expansion aqueous foam formulation containing dibenz-(b,f)-1,4-oxazepine and stabilizers selected from glycerine, carboxyl vinyl polymers, and mixtures thereof. The invention also relates to a method of obtaining visual obscuration and area denial in military operations through use of a novel, stable, high-expansion aqueous foam formulation containing dibenz-(b,f)-1,4-oxazepine in sufficient quantities to provide area denial for extended periods of time. The invention further relates to an aqueous foam formulation which will remain stale even when stored for extended periods of time under severe environmental stress conditions. The invention still further relates to an aqueous foam formulation containing dibenz-(b,f)-1,4-oxaepine as a deterrent which will adhere to the surfaces of objects or persons entering or moving about in a foam generated from the formulation. The invention also relates to a foam formulation which can be used as a single composite solution or as two separate solutions to be mixed immediately prior to foam generation in conventional fire fighting foam generators. Prior foam formulations have generally been adequate for achieving visual obscuration for short periods of time. Previous studies on foam formulations have used high expansion foams as carriers for selected deterrent chemicals such as military tear gar (CS), but these foams have exhibited inadequate foam stability in conjunction with a high liquid drainage rate. Only short-term effectiveness in visual obscuration and area denial have been achieved. (Author)

PAT-APPL-952 873 PC **A02**/MF **A01**
Department of the Army Washington DC
Copolymers of Alpha-N-Alkylstyrenes and Styrene.
Patent Application,
Helen B. Mertwoy, and Henry Gisser. Filed 19 Oct 78, 16p AD-D006 418/8
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention relates to novel copolymers of styrene and alpha-n-alkylstyrenes containing at least eleven carbon atoms in the alkyl group. Those copolymers of the invention which contain at least 20 mole percent of the alpha-n-alkylstyrenes are solids and have greater durability with lower coefficients of friction than a comparable styrene homopolymer. The copolymers of this invention can be produced by an anionic initiated copolymerization using metallic sodium as a catalyst or by a radical initiated copolymerization using benzoyl peroxide or azobisisobutyronitrile (AIBN) as the catalyst. (Author)

PATENT-4 152 987 PC **A02**/MF **A01**
Department of the Navy Washington DC
Impermeable Polymer Bomb Liner for Use with TNT Containing Explosives.
Patent,
Norman H. Lundstrom, and Russell Reed, Jr.
Filed 18 Feb 77, patented 8 May 79, 4p AD-D006 423/8, PAT-APPL-770 247
Supersedes PAT-APPL-770 247-77.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A polymeric bomb liner prepared from a polyvinylidene chloride latex emulsion. (Author)

PB80-802804 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Plastics Used as Building or Construction Materials. Volume 2. 1975-December, 1979 (Citations from the Engineering Index Data Base).
Rept. for 1975-Dec 79,
Diane M. Cavagnaro. Dec 79, 176p
Supersedes NTIS/PS-78/1294, NTIS/PS-77/1164. See also Volume 1, 1970-1974, NTIS/PS-77/1163.

The cited reports from a worldwide literature survey cover the performance, structural design, strength, and fire and weather resistance of plastics for construction materials. Some applications include plumbing fixtures, molding fixtures, laminates, roofing materials, and concrete additives. (This updated bibliography contains 170 abstracts, 32 of which are new entries to the previous edition.)

SAND-78-1842C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Fatigue Aging of Adhesive Bonds.
N. J. DeLollis. 1979, 15p CONF-790518-1
Contract EY-76-C-04-0789
10. US/UK symposium on neutron generators, Albuquerque, NM, USA, 21 May 1979.

A year long study has been made of the effect of fatigue on the bond between two epoxy encapsulant formulations and a fused alumina disc. The variables studied included isothermal aging at temperatures up to and including the cure temperature and cyclic thermal aging from +74 to -54 exp 0 C. The encapsulants were glass microballoon filled epoxies differing only in curing agents. One was cured with an aromatic amine eutectic (Shell Curing Agent Z). The other was cured with diethanolamine. The Z cured encapsulant bond failed completely at the bond interface with little or no aging; infrared evidence indicated a soluble interlayer as a possible cause of failure. The diethanolamine cured encapsulant survived a year of isothermal aging with little or no evidence of bond degradation. Cyclic thermal aging resulted in gradual bond failure with time. An extrapolation of the cyclic aging data indicates that the stresses induced by thermal cycling would result in complete bond failure in about 1200 days. (ERA citation 04:050385)

11J. Rubbers

AD-A075 865/6 PC **A02**/MF **A01**
Wright Air Development Center Wright-Patterson AFB Oh
Investigation of Silicate Esters as Rubber Plasticizers.
Technical rept.,
Donald L. Byerley. Aug 52, 19p Rept no. WADC-TR-52-180

A number of silicate esters, submitted by the John B. Pierce Foundation, Raritan, New Jersey, were evaluated as low-temperature rubber plasticizers. An attempt was also made to correlate structural variations of the esters with the properties imparted to the compounded rubber. It was found that, in general, as the ratio of the number of aliphatic carbon atoms/number of phenyl groups increased the ASTM brittle point was lowered. Variation of the structure of the silicate ester, on the other hand, appeared to have little effect on the physical properties (e.g. tensile strength, modulus, and elongation). Compatibility with common base polymers (Paracril 18, Paracril 35, and Neoprene W) decreased rather rapidly as the above ratio increased beyond a value of about 2.5. Extrapolation of these results indicates that a ratio value above 20 would not permit incorporation of a sufficient amount of the silicate ester to affect the low temperature properties of the compounded stock significantly. (Author)

AD-A076 265/8 PC **A03**/MF **A01**
Akron Univ Oh Inst of Polymer Science
Bonding Elastomer Layers Together by a Surface Oxidation Reaction.
Technical rept.,
R. J. Chang , A. N. Gent , C. C. Hsu , and K. C. Sehgal. 31 Oct 79, 34p Rept no. TR-5
Contract N00014-76-C-0408

An experimental study has been carried out of the self-adhesion of thin layers of three crosslinked elastomers: cis-polyisoprene (natural rubber) and two polybutadienes. For the polybutadiene materials, the strength of self-adhesion was found to be strongly dependent upon the time of exposure of the two surfaces to air before they were brought into contact. The strength rose dramatically during the first hour or so of exposure so that in some instances the layers could not later be forcibly separated. When the surfaces were exposed to air for longer periods before joining them, the strength of self-adhesion, caused by prior exposure to air for short periods, did not take place on exposure to nitrogen or for samples of cis-polyisoprene, and it was reduced or delayed in samples containing antioxidant. It is therefore attributed to surface oxidation reactions that can lead to the formation of interfacial covalent bonds with polybutadiene but not with polyisoprene. Some possible reaction schemes are discussed. (Author)

PB80-104227 Not available NTIS
National Bureau of Standards, Washington, DC.
Stress-Strain-Time Diagrams, Including Failure Envelopes, for High-Density Polyethylenes of Different Molecular Weight.
Final rept.,
L. J. Zapas, and J. M. Crissman. 1979, 9p
Pub. in ACS (American Chemical Society) Symposium Durability of Macromolecular Materials (Series 95), Paper 21, p301-309 1979.

The behavior in uniaxial loading under creep for three samples of linear polyethylene of different molecular weight is examined. Stress-strain-time diagrams, including failure envelopes are presented and compared to a phenomenological description of the instability of viscoelastic bars.

11L. Wood and Paper Products

PB80-801574 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Pollution and Its Control in the Paper and Pulp Industry. Volume 2. 1975-1977 (Citations from the Engineering Index Data Base).
Rept. for 1975-77,
Diane M. Cavagnaro. Dec 79, 210p
For the companion Published Searches of the NTIS Data Base, see NTIS/PS-78/1036 and PB80-801566. See also Volume 1, 1970-1974, NTIS/PS-76/0806.

Reports from worldwide research are cited, covering air, water, and solid waste pollution from the pulp and paper industry. The effects of the pollution on the environment as well as the ways to recycle effluents, economics, cost estimates, types of waste, detection, and socioeconomic effects. (This updated bibliography contains 203 abstracts, none of which are new entries to the previous edition.)

12. MATHEMATICAL SCIENCES

12A. Mathematics and Statistics

AD-A075 685/8 PC **A03**/MF **A01**
Lockheed Missiles and Space Co Inc Palo Alto Ca Palo Alto Research Lab
Partitioned Transient Analysis Procedures for Coupled-Field Problems: Accuracy Analysis.
Technical rept.,
K. C. Park , and C. A. Felippa. Jul 79, 33p Rept no. LMSC/D678072
Contract N00014-74-C-0355

Partitioned solution procedures for direct time integration of second-order coupled-field systems are

studied from the standpoint of accuracy. Such procedures are derived by three formulation steps: implicit integration of coupled governing equations, algebraic partitioning, and extrapolation to advance the solution. It is shown that the combined effect of partition, extrapolation and computational paths, dictates the choice of stable extrapolators and the preservation of rigid-body motions. Stable extrapolators for various computational paths are derived and implementation-extrapolator combinations which preserve rigid-body motions are identified. A spectral analysis shows that the partition itself, when stable, affects primarily frequency distortion. Finally, the advantages and shortcomings of five partitioned procedures are discussed as a guide to practical appplications. (Author)

AD-A075 745/0 PC **A02**/MF **A01**
Army Missile Command Redstone Arsenal Al Technology Lab
Determination of Digital Control System Response by Cross-Multiplication.
Technical rept.,
S. M. Seltzer. 29 May 79, 25p Rept no. DRSMI-T-79-58

This report describes the Cross-Multiplication technique for obtaining the response of a digital control system from its closed-loop transfer function. When the latter is expressed in the complex z-domain, the response is obtained at the sampling instants. If it is desired to know the response between the sampling instants, the submultiple method may be adapted to the cross-multiplication technique. When the transfer function is expressed in the modified z-transform domain, the response is obtained at any point within each sampling instant. The three approaches are described and applied to an example. (Author)

AD-A075 756/7 Not available NTIS
Carnegie-Mellon Univ Pittsburgh Pa
On the Relationship between the Genus and the Cardinality of the Maximum Matchings of a Graph,
Takao Nishizeki. 25 Apr 78, 9p ARO-13966.6-M
Grant DAAG29-77-G-0024
Availability: Pub. in Discrete Mathematics, v25 n2 p149-156 Feb 79 (No copies furnished by DTIC).

No abstract available.

AD-A075 757/5 Not available NTIS
Houston Univ Tx Dept of Electrical Engineering
Synthesis of Optimal Block Controllers for Multivariable Control Systems and Its Inverse Optimal-Control Problem,
Y. J. Wei , and L. S. Shieh. 3 Nov 78, 8p ARO-14483.6-M
Grant DAAG29-77-G-0143
Availability: Pub. in Proceedings of the Institution of Electrical Engineers, v126 n5 p449-456 May 79 (No copies furnished by DTIC).

No abstract available.

AD-A075 769/0 Not available NTIS
Saskatchewan Univ Saskatoon Coll of Engineering
IFAC Report Round Table Discussion on the Estimation and Control in Fuzzy Environments (Rapport IFAC. Discussion autour d'une Table, sur l'Estimation et le Controle dans un Environnement Flou),
Madan M. Gupta. 25 Apr 74, 5p
Title also appears in German and Russian.
Availability: Pub. in Automatica, v11 n2 p209-212 1975 (No copies furnished by DTIC).

No abstract available.

AD-A075 806/0 PC **A08**/MF **A01**
Honeywell Systems and Research Center Minneapolis Mn
Optimal Linear Control (Characterization and Loop Transmission Properties of Multivariable Systems).
Technical rept. no. 3, 1 Apr 77-31 Jul 78,
C. A. Harvey , and J. C. Doyle. 1 Aug 78, 160p 78SRC73, ONR-CR215-238-3
Contracts N00014-75-C-0144, DOE-E(11-1)-3070
Sponsored in part by Grant NASA-NSG-1323.

This report presents results on characterizations of multivariable control systems. The major results are: extension of the asymptotic modal approach of selecting quadratic performance indexes to the discrete case; the lack of guaranteed stability margins for linear quadratic Gaussian systems, and a design procedure to improve the stability margins for such systems; characterization of multivariable loop transmission properties in terms of singular values and singular vectors, which provides a meaningful concept for multivariable stability margins; and a method for selecting compensation structures to achieve desired loop transmission properties. (Author)

AD-A075 822/7 PC **A02**/MF **A01**
Kent State Univ Ohio Dept of Mathematics
On Incomplete Polynomials,
E. B. Saff , and R. S. Varga. 1978, 19p AFOSR-TR-79-1004
Grants AFOSR-74-2729, AFOSR-74-2688
Pub. in Numerische Methoden der Approximationstheorie, Band 4, ISNM v42 p281-298 1978. Errata sheet inserted. Sponsored in part by grant EY-76-S-02-2075.

No abstract available.

AD-A075 823/5 PC **A02**/MF **A01**
Kent State Univ Ohio Dept of Mathematics
Nonuniqueness of Best Approximating Complex Rational Functions,
E. B. Saff , and R. S. Varga. 2 Nov 76, 5p AFOSR-TR-79-1003
Grants AFOSR-74-2729, ERDA-E(11-1)-2075
Pub. in Bulletin of the American Mathematical Society, v83 n3 p375-377 May 77.

No abstract available.

AD-A075 843/3 Not available NTIS
Brown Univ Providence R I
Rates of Convergence for Stochastic Approximation Type Algorithms,
Harold J. Kushner , and Hai Huang. 27 Nov 78, 11p
Contract N00014-76-C-0279, Grant AFOSR-76-3063
Sponsored in part by Grant NSF-ENG73-03846.
Availability: Pub. in SIAM Jnl. of Control and Optimization, v17 n5 p607-617 Sep 79 (No copies furnished by DTIC).

No abstract available.

AD-A075 851/6 Not available NTIS
TRW Systems Group Redondo Beach Calif Advanced Technology Staff Group
Global Homotopies and Newton Methods,
Herbert B. Keller. 1977, 22p ARO-15622.9-M
Contracts DAAG29-78-C-0011, EY-76-S-03-0767
Availability: Pub. in Numerical Analysis, p73-94 1977 (No copies furnished by DTIC).

No abstract available.

AD-A075 994/4 PC **A02**/MF **A01**
Wright Air Development Center Wright-Patterson AFB Oh
The Statistical Analysis of Ranked Data.
Technical rept.,
Paul R. Rider. Feb 52, 25p Rept no. WADC-TR-52-32

Explanations are given of what is meant by ranked data. Questions of rank correlation and concordance are discussed. Coefficients of correlation and concordance are defined and methods of testing them for significance are described and illustrated. (Author)

AD-A076 176/7 PC **A03**/MF **A01**
Army Armament Research and Development Command Watervliet Ny Large Caliber Weapon Systems Lab
A Numerical Comparison between Two Unconstrained Variational Formulations.
Technical rept.,
J. J. Wu , and T. E. Simkins. Sep 79, 35p ARLCB-TR-79024, AD-E440 050
Presented at the Conference of Army Mathematicians (25th), 6-8 Jun 79, Johns Hopkins Univ., Baltimore, MD.

In an effort to relieve the often cumbersome burden of meeting the requirements on the end conditions and to unify the solution formulation for boundary- and initial-value problems, unconstrained variational statements have been introduced in conjunction with some approximate methods. In the case of a boundary value problem, it is shown in this paper that two different variational statements can be established: one is arrived at by the use of the LaGrange multipliers, the other by energy considerations. The numerical convergence of the solutions associated with finite element schemes using one of these two different variational statements is compared with that of the other. In the case of an initial value problem, both formulations can again be established when the adjoint field variable and the adjoint variational statement are introduced. The numerical data presented here indicate that while both methods generate excellent convergent results for the boundary value problem, the method of stiff springs yields results which show much better convergence for the initial value problem than those achieved by LaGrange multipliers.

AD-A076 270/8 PC **A02**/MF **A01**
Kent State Univ Ohio Dept of Mathematics
ALPS: Matrices with Nonpositive Off-Diagonal Entries,
A. Berman , R. C. Ward , and R. S. Varga. 15 Feb 79, 13p AFOSR-TR-79-1002
Grant AFOSR-74-2729
Pub. in Linear Algebra and Its Applications, v21 p233-244 1978. Prepared in cooperation with Technion - Israel Inst. of Tech, Haifa (Israel). Dept. of Mathematics, and Union Carbide Corp., Oak Ridge, TN. Mathematics and Statistics Research Dept.

No abstract available.

AD-A076 271/6 PC **A02**/MF **A01**
Kent State Univ Ohio Dept of Mathematics
Some Open Problems Concerning Polynomials and Rational Functions.
E. B. Saff , and R. S. Varga. 1977, 6p AFOSR-TR-79-1015
Grants AFOSR-74-2729, E(11-1)-2075
Pub. in Pade and Rational Approximations: Theory and Applications, p483-488 1977. Prepared in cooperation with University of South Florida, Tampa. Dept. of Mathematics, Grant AFOSR-74-2688.

No abstract available.

AD-A076 272/4 PC **A02**/MF **A01**
Kent State Univ Ohio Dept of Mathematics
Minimal Gersgorin Sets and omega Matrices,
G. M. Engel , and R. S. Varga. 25 Nov 75, 12p AFOSR-TR-79-1016
Grant AFOSR-74-2729
Pub. in Linear and Multilinear Algebra, v5 p1-10 1977. Prepared in cooperation with International Business Machines Corp., Owego, NY, and State Univ. of New York at Binghamton. Dept. of Mathematics.

No abstract available.

AD-A076 292/2 Not available NTIS
Army Research and Technology Labs Moffett Field Ca
Direct Solutions for Sturm-Liouville Systems with Discontinuous Coefficients,
Dewey H. Hodges. 7 Aug 78, 4p
Availability: Pub. in AIAA Jnl., v17 n8 p924-926 Aug 79 (No copies furnished by DTIC).

No abstract available.

AD-A076 338/3 PC **A06**/MF **A01**
Pittsburgh Univ Pa Learning Research and Development Center
Constructions in Geometry Problem Solving.
Technical rept.,
James G. Greeno. 27 Aug 79, 116p Rept nos. LRDC-1979/8, TR-3
Contract N00014-78-C-0022

The primary purpose of the report is to provide documentary evidence relevant to a model of planning knowledge that provides an explanation of constructions. The protocols are consistent with the general features of the model, but also show ways in which human problem solving involves processes more complex than those in the model.

illustrations of interaction between formal and informal reasoning processses are also noted.

AD-A076 339/1 PC **A04**/MF **A01**
Pittsburgh Univ Pa Learning Research and Development Center
Theory of Constructions and Set in Problem Solving.
Technical rept.,
James G. Greeno , Maria E. Magone , and Seth Chaiklin. 27 Aug 79, 67p
Contract N00014-78-C-0022

Hierarchically organized knowledge about actions has been postulated to explain planning in problem solving. Perdix, a simulation of problem solving in geometry with schematic planning, knowledge is described. Perdix' planning knowledge enables it to augment the problem space it is given by constructing auxiliary lines. The planning system also provides a mechanism that can result in problem-solving set. Results of three experiments involving set and constructions seem consistent with the kinds of knowledge structures hypothesized in the model. Protocols given during solution of 11 geometry problems showed general agreement with the explanation of construction and set based on planning knowledge, but also indicated processes of human problem solving not represented in the model. Finally, the explanation of constructions is discussed in relation to the general question of ill-structured problems and creativity, and the explanation of set is discussed in relation to other phenomena in the problem-solving literature, including functional fixedness. (Author)

AD-A076 343/3 PC **A02**/MF **A01**
State Univ of New York At Buffalo
Global Bounds and Approximations for Nonlinear Diffusion Problems.
Final rept.,
Paul William Davis. 14 Sep 79, 8p ARO-14245.5-M
Grant DAAG29-76-G-0239
Prepared in cooperation with Worcester Polytechnic Inst., MA.

This final report briefly summarizes the development and application of approximation and bounding techniques to nonlinear diffusion equations modelling phenomena in lubrication theory, combustion theory, heat flow. etc. The development of mathematical techniques has been guided by the need to meet physical problems. The mathematical techniques have been used to illuminate the behavior of models of various nonlinear diffusion phenomena. Techniques include monotone approximation schemes and nonlinear comparison theorems. These permit, for example, deriving bounds on solutions of nonlinear diffusion equations by finding functions which satisfy appropriate sets of differential inequalities. A typical application of these techniques has been the exploration of the relation between the stationary approximation of combustion theory and the full, time-dependent model. (Author)

COO-2874-45 PC **A02**/MF **A01**
Columbia Univ., New York. School of Public Health.
Confidence Intervals for the Odds Ratio in Cast-Control Studies: The State of the Art.
J. L. Fleiss. Apr 78, 23p
Contract EY-76-S-02-2874

Many approximate procedures are available for setting confidence limits around the odds ratio in a four-fold table. A number of them are analyzed according to three criteria: close agreement between the actual and the nominal confidence levels; exact agreement with a hypothesis test for or against significance; and relative simplicity in calculation. The procedure due to Cornfield comes closer to satisfying all three criteria than any of the others examined. Formulas are provided for an iterative solution to Cornfield's equations. (ERA citation 04:052401)

DOE/ER/10355-1 PC **A04**/MF **A01**
Society for Industrial and Applied Mathematics, Philadelphia, PA.
SIAM 1978 Fall Meeting and Symposium on Sparse Matrix Computations.
1978, 55p CONF-781098-(Absts.)
Contract EY-76-S-02-2874
Fall SIAM meeting, Knoxville, TN, USA, 30 Oct 1978.

The program and abstracts of the SIAM 1978 fall meeting in Knoxville, Tennessee, are given, along with those of the associated symposium on sparse matrix computations. The papers dealt with both pure mathematics and mathematics applied to many different subject areas. (ERA citation 04:052402)

NUREG/CR-1110 PC **A10**/MF **A01**
Kansas State Univ., Manhattan. Coll. of Engineering.
Bayesian Analysis of Component Failure Data.
Final technical rept.,
J. K. Shultis, F. A. Tillman, N. D. Eckhoff, and D. Grosh. Nov 79, 223p KSU-2662
Contract NRC-04-76-339

This report summarizes the many investigations made on the empirical Bayesian analysis of component failure data. In this study the analysis of attribute data of the failure-on-demand type was considered for components with low failure probabilities. Major areas emphasized in the study include (1) the development of computer techniques to obtain estimates of the prior distribution from observed failure data, (2) the use of simulation studies to investigate the inherent properties of different prior parameter estimation techniques, (3) the computation and comparison of probability and confidence intervals for the failure probability of individual components, and (4) the use of non-beta prior distributions such as a mixture of beta distributions or a gamma distribution. Four methods were examined for estimating parameters of the assumed prior beta distribution from failure data: (1) matching the moments of the prior distribution to those of the data; (2) matching the moments of the marginal distribution to those of the data; (3) the maximum likelihood method based on the prior distribution; and (4) the maximum likelihood method based on the marginal distribution.

N80-10814/5 PC **A12**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.
Issues in the Digital Implementation of Control Compensators.
Ph.D. Thesis.
P. Moroney. Oct 79, 265p NASA-CR-162416, LIDS-TH-951
Contract NGL-22-009-124

Techniques developed for the finite-precision implementation of digital filters were used, adapted, and extended for digital feedback compensators, with particular emphasis on steady state, linear-quadratic-Gaussian compensators. Topics covered include: (1) the linear-quadratic-Gaussian problem; (2) compensator structures; (3) architectural issues: serialism, parallelism, and pipelining; (4) finite wordlength effects: quantization noise, quantizing the coefficients, and limit cycles; and (5) the optimization of structures.

N80-10835/0 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
Lyapunov Stability and Its Application to Systems of Ordinary Differential Equations.
E. W. Kennedy. Sep 79, 32p NASA-TM-80806, REPT-79-FM-31

An outline and a brief introduction to some of the concepts and implications of Lyapunov stability theory are presented. Various aspects of the theory are illustrated by the inclusion of eight examples, including the Cartesian coordinate equations of the two-body problem, linear and nonlinear (Van der Pol's equation) oscillatory systems, and the linearized Kustaanheimo-Stiefel element equations for the unperturbed two-body problem.

N80-10836/8 PC **A02**/MF **A01**
Houston Univ., Tex. Dept. of Mathematics.
On the Consistency of the Maximum Likelihood Estimate of Normal Mixture Parameters for a Sample with Field Structure.
C. Peters. Aug 79, 18p NASA-CR-160352, REPT-74
Contract NAS9-15543

General theorems concerning the strong consistency of the MLE of exponential mixture parameters are proved. These theorems imply the strong consistency of the MLE of normal mixture parameters when the data is organized into fields each of which is a random sample from one of the component normal distributions.

ORNL/CSD-38 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Monte Carlo Comparisons of Selected Clustering Procedures.
C. K. Bayne, J. J. Beauchamp, C. L. Begovich, and V. E. Kane. Jul 79, 38p
Contract W-7405-ENG-26

Monte Carlo methods were used to estimate the percent misclassification of 13 clustering methods for six types of parameterizations of two bivariate normal populations. The clustering methods were compared by using the probabilities of misclassification and incidence matrices. It was determined that large correlations and differences in population sizes adversely influenced all clustering methods, where differences in the variance structure did not appreciably affect the results. The k-means partitioning method was the overall best method. Considering only agglomerative methods, the sum of squares, variance, furthest neighbor and rank score methods were generally superior to the other non-partitioning methods considered. The overall poorest methods were judged to be nearest neighbor and maximum likelihood. However, as the complexity of the distributions increased, the differences between all of the methods decreased. (ERA citation 04:050918)

ORO-3443-81 PC **A03**/MF **A01**
Maryland Univ., College Park. Inst. for Physical Science and Technology.
Direct and Inverse Error Estimates for Finite Elements with Mesh Refinements.
I. Babuska, R. B. Kellogg, and J. Pitkaeranta. Apr 79, 45p BN-907
Contract EY-76-S-05-3443

The finite element method is used to solve a second-order elliptic boundary-value problem on a polygonal domain. Mesh refinements and weighted Besov spaces are used to obtain optimal error estimates and inverse theorems. 2 figures. (ERA citation 04:050921)

12B. Operations Research

AD-A075 752/6 Not available NTIS
Montreal Univ (Quebec)
Minimum Cost Multicommodity Circulation Problem with Convex Arc-Costs,
Jacques A. Ferland. Feb 74, 7p DRB-REPRINT-4117
Availability: Pub. in Transportation Science, v8 n4 p355-360 Nov 74 (No copies furnished by DTIC).

No abstract available.

AD-A075 811/0 PC **A05**/MF **A01**
Stanford Univ Ca Dept of Operations Research
Documentation of a Computer Program for the Bound-and-Scan Algorithm for Integer Linear Programming.
Technical rept.,
Nancy F. Jacqmin. Jul 79, 90p Rept no. TR-87
Contract N00014-76-C-0418, Grant NSF-MCS76-81259

This report gives documentation for the computer code BDSCAN for solving integer linear programming problems using the bound-and-scan algorithm. A listing of the program with sample input and output is included. (Author)

AD-A075 849/0 Not available NTIS
Yale Univ New Haven Ct Cowles Foundation for Research in Economics
Logrolling and Budget Allocation Games,
M. Shubik , and L. Van DER Heyden. May 78, 16p Rept no. FOUNDATION PAPER-482
Contract N00014-76-C-0085
Availability: Pub. in International Jnl. of Game Theory, v7 p151-162 1979 (No copies furnished by DTIC).

No abstract available.

AD-A076 024/9 PC **A05**/MF **A01**
Stanford Univ Calif Dept of Psychology
Preference Trees.
Technical rept. no. 1, 1 Dec 78-1 Oct 79.
Amos Tversky, and Shmuel Sattath. 1 Oct 79, 90p
Contract N00014-79-C-0077

This paper develops a probabilistic choice model, called Preference Tree or Pretree, which describes choice as a covert hierarchical elimination process. Each alternative is represented as a measurable collection of aspects and the entire ensemble of aspects is assumed to have a tree structure. At each stage one selects an aspect (i.e., a branch of the tree) with probability that is proportional to its measure and eliminates all the alternatives that do not belong to the selected branch. The process continues until only a single alternative remains. Pretree is considerably more parsimonious than the more general model of Elimination-by-Aspects (EBA) because it has at most 2n rather than 2 to the nth power parameters, where n is the number of choice alternatives. At the same time, Pretree is much less restrictive than models (e.g., Luce, 1959) which assume that the strength of preference of x over y is independent of other alternatives. It is shown that the proposed model, which is based on random selection of aspects, is also compatible with a different decision strategy in which the aspects are considered in a fixed sequential order. Finally, Pretree is applied to the analysis of choice that is constrained by a partition imposed on the offered set (e.g., an agenda). It is shown that choice probabilities are unaffected by constraints if and only if the constraints are compatible with the structure of the tree. The effect of an agenda on individual choice is investigated experimentally, and its implications to committee decision making and consumer behavior are discussed.

AD-A076 264/1 PC **A05**/MF **A01**
Stanford Univ Calif Dept of Computer Science
Upper and Lower Bounds on Time-Space Tradeoffs in a Pebble Game.
Technical rept.,
Thomas Lengauer. Jul 79, 83p Rept no. STAN-CS-79-745
Contract N00014-76-C-0688

We derive asymptotically tight time-space tradeoffs for pebbling three different classes of directed acyclic graphs. Let N be the size of the graph, S the number of available pebbles, and T the time necessary for pebbling the graph. A time-space tradeoff of the form ST=Theta(N-squared) is proved for pebbling(using only black pebbles) a special class of permutation graphs that implement the bit reversal permutation. If we are allowed to use black and white pebbles the time-space tradeoff is shown to be of the form T=Theta(N-squared/S-squared)+Theta(N). A time-space tradeoff of the form T=S Theta(N/S)-to the power Theta(N/S) is proved for pebbling a class of graphs constructed by stacking superconcentrators in series. This time-space tradeoff holds whether we use only black or black and white pebbles. A time-space tradeoff of the form T=S 2 to the power 2 to the power Theta(N/s) is proved for pebbling general directed acyclic graphs with only black or black and white pebbles. (Author)

13. MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

13A. Air Conditioning, Heating, Lighting, and Ventilating

AD-A075 800/3 PC **A02**/MF **A01**
Army Natick Research and Development Command MA
Evaluation of Liquid Fuel Field Space Heaters: Standard Military, Developmental and Foreign.
Final rept. Oct 75-Oct 78,
William Nykvist. Oct 78, 4p Rept no. NATICK/TR-79/021

This report covers research intended to develop an awareness of the design problems in liquid fuel field space heating and to investigate alternative design concepts. Tests were carried out on 13 heaters of which 7 were the experimental/developmental type. Results indicate superior performance is achieved by burners which employ hydroxylative combustion, which is slower, more complete combustion where the oxygen is admitted in stages or is diluted by exhaust gases. It is recommended that prototypes of two heaters which incorporate this type of combustion, a triple-stage heater and a return-stack heater, be built and field tested. (Author)

AD-A076 341/7 PC **A03**/MF **A01**
Naval Weapons Center China Lake Ca
Economic Feasibility Study of the Geothermal Project for the Naval Station, Adak, Alaska,
Technical memo.,
James L. Bruce. Jan 79, 46p NWC-TM-3750, GIDEP-E150-1544

The Adak Geothermal Project is concerned with the use of geothermal energy as a possible alternative to the present fossil fuel energy system on Adak. Three different types of geothermal energy systems, each based on an assumed different reservoir temperature range, are considered. These systems, which could supply the facilities on Adak with energy for space heating or complete electrical power including electrical heating, are: (1) space heating using either above-ground insulated fiberglass pipelines or in-ground insulated steel pipelines, (2) direct electrical power generation using geothermal fluids either at a central power plant or via individual wellhead generating units, either system producing 25 MWe gross output, or (3) a binary geothermal electrical power generation facility where the geothermal fluids would heat a secondary (binary) fluid which would operate the electrical generating equipment, producing a 25 MWe gross output. The cost of each system was analyzed, and cost-effectiveness was determined by comparing the investment cost with projected fuel savings. An investment return (payback period) for each system was determined using an 8% annual fuel escalation factor. A comparison was made between the Navy price for JP-5 aviation fuel (main fuel on Adak) and the apparent real cost of this type fuel to other remote regions in Alaska. This gave comparative payback costs of this type of energy system if developed by private industry.

ALO-4261-T5 PC **A05**/MF **A01**
Science Applications, Inc., McLean, VA.
Eighth Monthly Technical Status Report, December 1-December 31, 1978.
20 Jan 79, 80p
Contract EM-78-C-04-4261

Progress in all tasks is reviewed briefly. Charts which represent the monthly reports are included. The appendices include: a summary of additional needs, heat pump model description, heat pump model preliminary results, an interim report, and simplified methodologies. (ERA citation 04:054422)

ALO-4261-T6 PC **A06**/MF **A01**
Science Applications, Inc., McLean, VA.
Revised Management Plan, Milestone Plan, Cost Plan, and Manpower Plan. Sixth and Seventh Monthly Status Reports, October 1-November 30, 1978.
1978, 107p
Contract EM-78-C-04-4261

The following are included: project background and discussion, technical progress reports for all subtasks, contract management summary report, milestone schedule and status report, milestone log, cost plans, cost management reports, manpower plans, and manpower management reports. The following appendices are included: selection of heat pumps simulation locations, economic computations, fuel costs, system studies, recommended methodology for calculating residential load models, potential performance of heat pumps, data required from cooling contractors, cooling locations, thermal outputs: cooling, recommended inputs for the 25 ton advanced cooling simulation study, meteorological data, and contract modification. (ERA citation 04:054423)

BNL-25022 PC **A03**/MF **A01**
Brookhaven National Lab., Upton, NY.
Application of District Heating System to U.S. Urban Areas.
J. Karkheck, and J. Powell. 1978, 29p CONF-780228-3
Contract EY-76-C-02-0016
AAAS meeting- Abstract cleared 9/22/77 with the title, "Is Zero Energy Growth Feasible in the Residential Sector.", Washington, DC, USA, Feb 1978.

In the last few decades district-heating systems have been widely used in a number of European countries using waste heat from electric generation or refuse incineration, as well as energy from primary sources such as geothermal wells or fossil-fired boilers. The current world status of district-heat utilization is summarized. Cost and implementation projections for district-heating systems in the U. S. are discussed in comparison with existing modes of space conditioning and domestic water heating. A substantial fraction, i.e., up to approximately one-half of the U.S. population could employ district-heating systems using waste heat, with present population-distribution patterns. U.S. energy usage would be reduced by an equivalent of approximately 30 percent of current oil imports. Detailed analyses of a number of urban areas are used to formulate conceptual district energy-supply systems, potential implementation levels, and projected energy costs. Important national ancillary economic and social benefits are described, and potential difficulties relating to the implementation of district-heating systems in the U.S. are discussed. District-heating systems appear very attractive for meeting future U.S. energy needs. The technology is well established. The cost/benefit yield is favorable, and the conservation potential is significant. District heating can be applied in urban and densely populated suburban areas. The remaining demand, in rural and low-population-density communities, appears to be better suited to other forms of system substitution. (ERA citation 04:026705)

BNL-26216 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Computer Simulation of Ground Coupled Storage in a Series Solar Assisted Heat Pump System.
J. W. Andrews, and P. D. Metz. 1979, 5p CONF-790541-25
Contract EY-76-C-02-0016
International Solar Energy Society meeting, Atlanta, GA, USA, 28 May 1979.

A quantitative study of the effect of thermal coupling between the ground and the heat storage element of a series solar assisted heat pump system is presented. The transient simulation computer program TRNSYS is used to simulate the solar portion of this system. A program to simulate the thermal interaction of the storage element with the ground is incorporated into TRNSYS as a sub-routine. This program calculates heat flow through the ground in discrete steps over space and time. Boundary conditions are established. The ground coupled storage is driven by thermal inputs from the solar portion of the system and from the changing ambient and ground temperatures. (ERA citation 04:048478)

BNL-50974 PC **A07**/MF **A01**
Brookhaven National Lab., Upton, NY.
Solar-Powered Steam Generator Heliostat. Final Report.
J. G. Cottingham. Dec 78, 143p
Contract EY-76-C-02-0016

A small-size central-receiver-type solar energy collecting system delivering commercial grade steam is analyzed and a wind avoidance type heliostat designed, built, and successfully tested. The heliostat design effort is described, including reflecting surface materials and measurements, optic considerations and mirror field arrangements, mechanical analysis and fabrication techniques, and economics and cost effectiveness. Measurements of normal incident solar energy at Upton, N.Y., are reported and a method is proposed for estimating this input parameter for other locations proposed. (ERA citation 04:049767)

BNL-51019 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Thermal Mats for Space Heating and Cooling.
P. P. Szydlik, and A. L. Berlad. Mar 79, 20p

Contract EY-76-C-02-0016

A study is made of a single solar-powered device (e.g., a flexible plastic mat with an air space or water channel) to accomplish both direct-gain heating and space cooling or water heating. In the former operating mode, heating load reductions of 10 to 30% can be achieved for small structures under cold, sunny midwinter weather conditions. With water flowing, cooling load reductions of 25% are obtainable with the mats attached to only one large surface of similar structures. The mats also possess significant water heating capability which is a function of flow rate as well as solar flux. When operated simultaneously as space-cooling devices, they can serve as efficient water preheaters. For lower flow rates, temperature rises are sufficiently high for direct coupling to domestic hot water supplies. (ERA citation 04:054424)

CONF-790808-15 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Evaporative-Pad Heat Transfer Performance in a Simulated Waste-Heat Environment.
M. Olszewski. 1979, 26p
Contract W-7405-ENG-26
18. ASME national heat transfer conference, San Diego, CA, USA, Aug 1979.

Greenhouse uses of low-grade waste heat have been investigated at the Oak Ridge National Laboratory (ORNL) for a number of years. These investigations have focused on evaporative-pad concepts that are capable of providing both summer cooling and winter heating. As part of this program, performance testing of potential evaporative-pad materials has been performed at ORNL. Results of an experimental investigation of the performance of CELdek packing under simulated waste heat greenhouse conditions are reported. The objective of this study was to characterize the air heating capability of the material as well as its air cooling ability. A cooling efficiency of 85 to 95% was achieved for adiabatic saturation operation. For nonadiabatic saturation conditions, air cooling in excess of 11 exp 0 C can be achieved if the inlet air wet bulb depression is 15 exp 0 C. When the wet bulb depression is decreased to 7.8 exp 0 C, air cooling in excess of 5.6 exp 0 C is achievable. The results also indicate that CELdek is effective in the heating mode. Energy transport was found to be strongly dependent on water flow rate. Air side pressure drop was found to vary linearly with face velocity and varied from 10.2 to 28.1 Pa over a face velocity range of 1.3 to 2.6 m/sec. The pressure drop was also found to be independent of water flow rate up to the limit (8.4 x 10 exp -4 m exp 3 /s/m of pad length) tested. (ERA citation 04:050276)

COO-4351-6 PC **A10**/MF **A01**
Kaman Sciences Corp., Colorado Springs, CO.
Phoenix City of Colorado Springs Solar Assisted Heat Pump Project. Technical Report, December 1, 1977-April 1, 1978.
D. M. Jardine, and D. W. Jones. Jun 78, 225p
Contract EG-77-C-02-4351

The design of packaged Solar Assisted Optimized Heat Pump (SAOHP) systems as a step towards stimulating the advancement of an industrial, commercial, and professional capability for producing and distributing this type of system is covered. The SAOHP system consists of a collector group, a ground coupled seasonal storage (GCSS) group, and an energy transport and distribution (ETD) group. The design for the collector group with first tier parts and assembly lists are included, along with the ETD group designs for the smaller capacity units. Rating curves are included for the 30,000 BtuH (2-1/2 ton), 36,000 BtuH (3 ton), 48,000 BtuH (4 ton), 60,000 BtuH (5 ton) and 90,000 BtuH (7-1/2 ton) units. All system revisions have been completed and the results of these revisions documented. The system analysis program, modified to compliance with NBS 76-1137 during the second quarter, has been successfully generating daily, weekly and monthly energy balances. Reliability of the SAOHP system has been fair this quarter and problems occurring are documented. Climatic region definition work is included in complete form. The economic analysis format for making life cycle cost comparisons between various available heating and cooling systems and the SAOHP is included. A list of visitors, project photographs and presentations are included in the appendices. (ERA citation 04:054425)

COO-4400-11 PC **A02**/MF **A01**
McColl-Wade, Inc., Branford, CT.
Technical Status Report No. 11, December 15, 1978-March 15, 1979.
J. R. McColl, Jr., and W. H. Wade. 1979, 3p
Contract EG-77-A-02-4400

The objectives, progress summary, changes, and problem areas for this solar air heating and hot water system are reviewed briefly. (ERA citation 04:054426)

DOE/CS-0089 PC **A07**/MF **A01**
Department of Energy, Washington, DC. Office of Conservation and Solar Applications.
National Program Plan for Passive and Hybrid Solar Heating and Cooling. Interim Report.
Jun 79, 132p

The National Program Plan for Passive Solar Heating and Cooling consists of four major parts. The first part describes the planning context. A definition of a passive solar system is given, as well as a background of Federal involvement in passive solar heating and cooling, program goals and objectives, and an overall implementation approach. The second part addresses the technology development program area. Background information on the status of and the strategy and emphasis for technology development is provided, followed by descriptions of passive heating and passive cooling systems and an overview of task classifications for technology development. The third part describes the technology utilization program area. Again, background information is given on the status of and the strategy and emphasis for technology utilization. This is followed by a narrative description of the technology utilization process and an overview of task classifications for technology utilization. The fourth part (Appendices) provides detailed information on the tasks and schedules. Appendix A contains brief descriptions of the technology development tasks. Appendix B presents system development schedules for promising passive solar heating and cooling systems selected for intensive development activity. Appendix C contains brief descriptions of the technology utilization tasks. Appendix D presents schedules for utilization tasks selected for near-term implementation. Appendix E presents the projected energy impact of passive solar space-heating of residences and light commercial buildings. (ERA citation 04:052905)

DOE/ERD-0018 PC **A03**/MF **A01**
Department of Energy, Washington, DC.
Environmental Readiness Document: Solar Heating and Cooling of Buildings.
Sep 79, 28p

The technology is described briefly and the environmental concerns associated with it are reviewed. A status report on the technical and environmental R and D programs is provided and the relationship between the technical and environmental R and D is displayed in a milestone chart in terms of desirable timing. The likelihood of adverse findings concerning the environmental acceptability of the technology, the problems and uncertainties stemming from current or anticipated environmental regulation, and the potential costs of environmental controls are examined. An assessment is offered of the existing or potential barriers to commercialization. A tabulation of environmental concerns is presented with the research needed to resolve the concerns and its estimated cost. (ERA citation 04:054427)

DOE/ERD-0025 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Environmental Readiness Document: Solar Agriculture and Industrial Process Heat.
Aug 79, 19p

The uncertainties about environmental aspects of solar agricultural and industrial process heat (SAIPH) that remain to be resolved through research and development are examined. The characteristics of the technology are highlighted, a status report is provided on the technical and environmental R and D programs, a milestone chart is presented representing a relationship between a considered commercialization schedule and relevant environmental R and D, and the environmental concerns significant to the technology are reviewed. The likelihood and consequences of adverse findings, the problems and uncertainties stemming from current or anticipated environmental regulation, and the potential costs of environmental controls are examined. As assessment of the existing or potential barriers to commercialization is made. A summary of present, planned, and additional environmental resource requirements for SAIPH is included. (ERA citation 04:054467)

DOE/ET/248447-1 PC **A09**/MF **A01**
Aerojet Energy Conversion Co., Sacramento, CA.
Multi-Use Geothermal Energy System with Augmentation for Enhanced Utilization. Non-Electric Application of Geothermal Energy in Susanville, California. Final Report.
G. K. Olsonn, D. L. Benner-Drury, and G. R. Cunnington. Feb 79, 200p
Contract ET-78-C-03-1740

Aerojet Energy Conversion Company has completed a site specific engineering and economic study of multi-use, augmented geothermal space/water heating and cooling systems in cooperation with the City of Susanville, California. The overall benefits to the City of Susanville, in both the public and private sectors, of using low temperature (150 exp 0 F to 240 exp 0 F) geothermal resources are explored. Options considered, alone and in combination, include heat pumps, fossil-fuel peaking, user load balancing, and cascading from the geothermal system serving the public buildings into a private Park of Commerce development. A range of well temperatures, depths, flow rates, and drilling costs are considered to provide system cost sensitivites and to make the study more widely useful to other sites. A planned development is emphasized for ease of financing and expansion. A preliminary design of Phase A of a Susanville Public Building Energy System and a conceptual design of an integrated park of Commerce, Phase I, are included. This system was designed for a 150 exp 0 F resource and can be used as a model for other communities with similar resource temperatures. (ERA citation 04:051399)

DOE/NASA/CR-150728 PC **A03**/MF **A01**
Copper Development Association, Inc., New York.
Collation of Monthly and Semi-Annual Reports on Instrumentation at the "Decade 80" House in Tucson, Arizona.
Jun 78, 27p
Contract EX-76-A-29-1037

The "Decade 80" solar house, located in Tucson, Arizona, was built by the Copper Development Association, Inc., to show the use of copper in home building and to demonstrate the use of solar energy to provide space heating and cooling and domestic hot water. The auxiliary energy sources are electrical resistance heating for the domestic hot water and a gas-fired boiler for space heating and operation of the absorption air conditioning units. This program to instrument the "Decade 80" solar house and to acquire performance data on the system began in November 1976. The Semi-Annual report gives an overview of the instrumentation effort through February 17, 1978, with the back-up monthly reports reflecting more detail of the effort that went into the implementation of the data acquisition system through April 1978. (ERA citation 04:025968)

DOE/NASA/CR-161237 PC **A11**/MF **A01**
National Aeronautics and Space Administration, Huntsville, AL. George C. Marshall Space Flight Center.
Solar Heating, Cooling, and Hot Water Systems Installed at Richland, Washington. Final Report.
Jun 79, 233p
Contracts EX-76-A-29-1037, EX-76-C-01-2404

Project Sunburst is a demonstration system for solar space heating and cooling and solar hot water heating for a 14,400 square foot office building in Richland, Washington. The project is part of the US Department of Energy's solar demonstration program, and became operational in April 1978. The solar system uses 6,000 square feet of flat-plate liquid collectors in a closed loop to deliv-

er solar energy through a liquid--liquid heat exchanger to the building heat-pump duct work or 9,000-gallon thermal energy storage tank. A 25-ton Arkla solar-driven absorption chiller provides the cooling, in conjunction with a 2,000 gallon chilled water storage tank and reflective ponds on three sides of the building to reject surplus heat. A near-by building is essentially identical except for having conventional heat-pump heating and cooling, and can serve as an experimental control. An on-going public relations program has been provided from the beginning of the program and has resulted in numerous visitors and tour groups. (ERA citation 04:052906)

DOE/NASA/CR-161271 PC **A07**/MF **A01**
Wilson and Co., Salina, KS.
Solar Heating and Hot Water System Installed at Southeast of Saline, Unified School District 306, Mentor, Kansas.
Jul 79, 127p
Contract EG-77-A-01-4077

A cooperative agreement was negotiated in April 1978 for the installation of a space and domestic hot water system at Southeast of Saline, Kansas Unified School District 306, Mentor, Kansas. The solar system was installed in a new building and was designed to provide 52 percent of the estimated annual space heating load and 84 percent of the estimated annual potable hot water requirement. The collectors are liquid flat plate. They are ground-mounted and cover a total area of 5125 square feet. The system will provide supplemental heat for the school's closed-loop water-to-air heat pump system and domestic hot water. The storage medium is water inside steel tanks with a capacity of 11,828 gallons for space heating and 1,600 gallons for domestic hot water. This final report, which describes in considerable detail the solar heating facility, contains detailed drawings of the completed system. The facility was declared operational in September 1978, and has functioned successfully since. (ERA citation 04:054429)

DOE/NASA/CR-161272 PC **A06**/MF **A01**
Clarksville Community School Corp., IN.
Solar Energy Retrofit for Clarksville Middle School, Clarksville, Indiana. Final Report.
Aug 79, 124p
Contracts EX-76-A-29-1037, EG-77-A-01-4076

This final report describes in detail the solar energy retrofit heating system installed to provide heating for two gymnasiums at the Clarksville Middle School located in Clarksville, Indiana. The solar components were partly funded by the Department of Energy, and the technical management was done by the Marshall Space Flight Center. The system type is hot water using existing chilled water piping and chilled water coils in an air handler system. Flat-plate, single-glazed selectively coated solar collectors were installed on the roof of each gymnasium. Total collector area covers 6,520 square feet. The liquid is stored in a 10,000 gallon steel tank installed below grade. (ERA citation 04:054430)

DOE/TIC-10160 PC **A04**/MF **A01**
Illinois Committee for Energy and Architecture, Springfield.
Solar House Design Competition.
1977, 58p

Competition winners are described and illustrated. The winners are pictured in the following categories: single family passive designs, single family active designs and multi-family active designs. (ERA citation 04:051299)

DOE/TIC-10386 PC **A06**/MF **A01**
Midwest Research Inst., Kansas City, MO.
Solar Heating and Cooling of Buildings (SHACOB) Commercialization Report: Options and Strategies. Part A. Volume III. Appendices. Final Report.
15 Jul 77, 168p

The following appendices are included: industry activities, solar commercialization activities at the state and local level, electric utility interface, description of the computer model, and comparison with other energy investments. (ERA citation 04:054432)

DOE/TIC-10648 PC **A04**/MF **A01**
Little (Arthur D.), Inc., Cambridge, MA.
Solar Heating and Cooling of Buildings (SHACOB) Commercialization Report. Part B: Analysis of Market Development. Volume III. Appendices. Final Report.
Sep 77, 59p

The appendices include documentation of the SHACOB Commercialization Model, the underlying Model assumptions and the resulting data base, and incentives. (ERA citation 04:054433)

DOE/TIC-10744 PC **A02**/MF **A01**
Little (Arthur D.), Inc., Cambridge, MA.
Solar Heating and Cooling of Buildings (SHACOB) Commercialization Report. Part B: Analysis of Market Development. Volume 1. Executive Summary. Final Report.
Sep 77, 25p

The following are summarized: programs objective and scope, quantitative results, discussion of financial incentives, model philosophy and description, industry infrastructure, and market research. (ERA citation 04:054434)

DOE-tr-185 PC **A05**/MF **A01**
Ministry of Trade and Industry (Finland).
Information on the Fundamental Improvement of a Private Home: Save Money, Energy, and This Guide.
77p
Translation source information not available.

This guide, published by the Finnish Ministry of Trade and Industry, contains information on how to improve houses in order to minimize costs for maintenance and heating and to improve comfort. (ERA citation 04:051850)

EPRI-ER-1078 PC **A03**/MF **A01**
Daystar Corp., Burlington, MA.
Solar Water Heating and Data Monitoring Systems at South County Hospital, Wakefield, Rhode Island. Final Report.
R. D. Cummings, D. J. Peck, and W. J. Hall. Jun 79, 43p

Daystar Corporation installed a solar/electric, domestic water heating system in the Borda Wing of the South County Hospital, Wakefield, Rhode Island, in 1975. THe primary purpose of this project was to study the feasibility of the use of Solar Energy in a commercial, healthcare institution. The thermal performance of this system was monitored from December 1976 through March 1978. The final stages of the development of the computerized monitoring system, and the system performance results for the 16 month monitoring period are described. (ERA citation 04:051316)

EPRI-ER-1095-SR PC **A03**/MF **A01**
Electric Power Research Inst., Palo Alto, CA.
Solar Heating and Cooling Research Projects: A Summary.
N. Lansing. May 79, 30p

The major EPRI solar heating and cooling experimental projects are summarized. In addition to outlining each project and its purpose, the report describes the major features of the solar systems. Also included are relatively detailed descriptions of the performance-monitoring equipment. As additional technical performance results are obtained and new projects added to the program, this document will be updated to include the new information. These projects provide a basis for verification of analytic work aimed at determining the preferred solar system for any given utility service area, i.e., the system that provides the lowest total cost to the consumer and the utility. (ERA citation 04:051300)

FE-1726-30A PC **A04**/MF **A01**
National Coal Board, Leatherhead (England). Coal Utilization Research Lab.
Engineer, Design, Construct, Test and Evaluate a Pressurized Fluidized Bed Pilot Plant Using High Sulfur Coal for Production of Electric Power. Phase I: Preliminary Engineering. PFB Combustor/Heat Exchanger Rig Test at Leatherhead.
Dec 77, 67p CW-WR-76-016.30A
Contract EX-C-01-1726

A test of 100 hour duration has been carried out in the pressurized combustor at Leatherhead, England, to investigate the behavior of a heat exchanger and distributor plate designed and fabricated by Curtiss-Wright and Dorr-Oliver. The heat exchanger consisted of seven large diameter, vertical, finned tubes in a fluidized bed of 8 ft. depth. Datum operating conditions were: pressure, 6 atm absolute; fluidizing velocity, 2 1/2 ft/s; and bed temperature, 1600/1650 exp 0 F. Bed temperature was also varied over the range 1450 exp 0 F to 1730 exp 0 F. Temperature distribution in the bed was extremely uniform (+- 30 exp 0 F or better) with no evidence of significant clinkering or poor fluidization. Combustion efficiency at datum conditions was 98 1/2 to 99%, with little, if any, combustion in the freeboard. The outside (bed to tube) heat transfer coefficient for the central tube cooled by air, calculated using NRDC test data, was approximately 45 Btu/hr ft exp 2 exp 0 F. The overall heat transfer coefficiency between the gas and air averaged 21.8 Btu/hr ft exp 2 exp 0 F. Dolomite was fed at a typical Ca/S mol ration of 1.6. Equilibrium was only reached towards the end of the test, when a sulphur retention of 85% was approached. The coal was Illinois No. 6. NO/sub x/ emissions were typically 150 ppM. Start-up was demonstrated at a bed depth of 6 ft. with this heat exchanger, whereas beds with horizontally oriented tubes have required shallow bed depths for starting fluidization. (ERA citation 04:054608)

FE-1726-41A PC **A03**/MF **A01**
Curtiss-Wright Corp., Wood-Ridge, NJ. Power Systems Div.
Engineer, Design, Construct, Test and Evaluate a Pressurized Fluidized Bed Pilot Plant Using High Sulfur Coal for Production of Electric Power. Phase I: Preliminary Engineering. Quarterly Report, September 1-November 30, 1977.
Dec 77, 41p CW-WR-76-015.41A
Contract EX-76-C-01-1726

The test report prepared by NRDC for the PFB heat exchanger tested at the NRDC Leatherhead Facility was received by Curtiss-Wright and results are reported herein. Metallurgical evaluation of the heat exchanger has been completed. The tube materials specimens inserted in one of the Dorr-Oliver client FB reactors accumulated an additional 2600 hours of operating time before being removed. Total time was 4300 hours which exceeded the original goal. The SGT/PFB Technology Rig shakedown testing continued. A revised heat exchanger tube restraint was tested with satisfactory structural results. Coal dolomite and ash system shakedown testing during rig operation has resulted in numerous revisions to system details and operating procedures to alleviate interruptions in feeding and discharging of materials. Design and fabrication were initiated for modifications being incorporated into the SGT rig to test a broad range of candidate PFB tube materials, turbine materials, coatings for the foregoing candidates and several on-line particulate monitoring instruments. Final pilot plant design proceeded from the preliminary design completed last quarter. The specification for the secondary hot gas clean-up system was completed and work is nearly complete on the coal preparation and injection equipment and the dolomite injection equipment specifications. Control system definition and specification of control equipment, valves and instrumentation is continuing. (ERA citation 04:054609)

FE-2489-40 PC **A03**/MF **A01**
Institute of Gas Technology, Chicago, IL.
Development of Combustion Data to Utilize Low-Btu Gases as Industrial Process Fuels. Project 61004 Special Report No. 6: High-Excess-Air Burner.
R. T. Waibel, and E. S. Fleming. Mar 79, 44p
Contract EX-76-C-01-2489

Data were collected to evaluate the performance of a high-excess-air type burner when retrofit with low-Btu gases. The burner, a North American Model 4422-7 XSA, was fired on the IGT pilot-scale test furnace with a load simulating a section or zone of a refractory kiln. The low-Btu gases simulated for these commbustion trials were Koppers--Totzek oxygen (KTO), Wellman--Galusha air (WGA), and Winkler air (WA) fuel gases. KTO ex-

hibited no flame stability problems at a 3 million Btu/hr firing rate with excess air levels from 10% to 77% - the maximum air flow our blower could attain. KTO did not require a burner pilot for stability. WGA fired at 3 million Btu/hr was stable with a pilot flame at excess air levels from 10% to the blower maximum, which was 65% excess air for WGA. With no pilot flame, WGA blew off in all cases. With the pilot, WA, at 3 million Btu/hr, did not have a stable flame, even with only 10% excess air; however, at 2.5 million Btu/hr WA had a stable flame at excess air levels from 10% to the maximum, 97%, with the pilot on. Blowoff occurred when the pilot was extinguished. KTO, with 50% excess air, gave a higher thermal efficiency and peak flame temperature than natural gas with the same excess air level. WGA fired at 10% excess air performed as well as the natural gas with 50% excess air in terms of thermal efficiency and exceeded natural gas in radiant flux. WGA, however, had a flame length about 3 times that of natural gas. WA at 2.5 million Btu/hr, 10% excess air had the same thermal efficiency (25%) as natural gas exhibited at 3.0 million Btu/hr with 50% excess air, but had lower gas temperatures and radiant flux. (ERA citation 04:052527)

IDO-1570-T17 PC **A02**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
Heat Pumps: Primer for Use with Low Temperature Geothermal Resources.
J. G. Keller. 16 Nov 77, 24p
Contract EY-76-C-07-1570

Attention is focussed on using heat pumps to obtain heat energy from low temperature geothermal resources. The principles of heat pumps are examined to explore applications in residential and commercial heat requirements. Availability and costs are discussed. This is intended to serve as a primer and user document requiring no background in heat pump technology. (ERA citation 04:054587)

N80-10601/6 PC **A04**/MF **A01**
Honeywell, Inc., Minneapolis, Minn.
Ocmulgee National Monument Visitor Center Solar Heating and Cooling System Design Review Data.
May 78, 72p NASA-CR-150706
Contract NAS8-32093
Subm-Prepared for NASA and DOE.

The design of a solar heating and cooling system is documented. Solar collectors, design approaches, system trade studies, and preliminary specifications are discussed.

N80-10602/4 PC **A05**/MF **A01**
Honeywell, Inc., Minneapolis, Minn. Energy Resources Center.
Solar Heating and Cooling Systems Design and Development.
Quarterly Report, 9 Jul. - 9 Oct. 1976.
Oct 76, 81p NASA-CR-150618, HONEYWELL-F3437-QR-101
Contract NAS8-32093
Subm-Prepared for DOE.

Solar heating and heating/cooling systems were designed for single family, multifamily, and commerical applications. Subsystems considered included solar collectors, heat storage systems, auxiliary energy sources, working fluids, and supplementary controls, piping, and pumps.

N80-10604/0 PC **A02**/MF **A01**
Western Kentucky Univ., Bowling Green.
Mafc Solar Heating and Cooling High Speed Performance (HISPER) Code Validation.
Final Report.
H. M. Healey. 12 Oct 79, 15p NASA-CR-161323
Contract NAS8-33387

The status of the Solar Heating and Cooling Project is reported. Modifications to the HISPER program are outlined, and recommendations concerning the validation study of HISPER are included.

PB80-103732 Not available NTIS
National Bureau of Standards, Washington, DC.
New Testing and Rating Procedures for Seasonal Performance of Heat Pumps.
Final rept.,
D. A. Didion. Sep 79, 11p
Pub. in Proceedings of the Carrier International Symposium on Heat Pumps and Space Conditioning in the 1990's Held at Syracuse, NY. on February 2-3, 1979, p37-47, Sep 79.

Current Testing and rating procedures for heat pumps have served industry and the consumer well for many years. These steady-state (SS) full-load evaluation procedures allow for the capacity determination needed for sizing the unit to the building loads. They also serve as an efficiency evaluation for comparing the realtive merits of various units. However, with the need for energy conservation, and with increasing energy costs, buildings and their equipment have come to require a life-cycle-cost analysis instead of the traditional first-cost approach. In order to provide a better estimate of operational costs, the heat pump industry needs a more comprehensive evaluation technique to obtain data during part-load, cyclic operation. Although the wide variety of types of heat-pump installations and climates makes field performance impractical as a basis for this cost analysis, laboratory part-load simulation can increase the input for a reasonable testing investment. Part-load laboratory evaluation offers two added benefits; a more accurate estimate of energy usage on an absolute basis, hence a better comparison between heat pumps and other equipment, needed at least for the heating mode; and encouragement to manufacturers to develop a more efficient product, since they can get more credit for their innovations.

PB80-103823 Not available NTIS
National Bureau of Standards, Washington, DC.
Review of Hydrodynamics and Heat Transfer for Large Helium Cooling Systems.
Final rept.,
M. C. Jones, and V. D. Arp. Aug 78, 8p
Pub. in Cryogenics 18, n8, p483-490, Aug 78.

The paper is a review of recent experimental results and computational methods needed for the fluid engineering aspects of helium cooling systems for power applications. The discussion is illustrated by three different applications: large magnets; power transmission lines, and ac generators. An attempt is made to put recent research into perspective, considering the requirements of each application, and problems in need of further research are pointed out.

PB80-109564 PC **A04**/MF **A01**
Parkman Center for Urban Affairs, Boston, MA.
Promoting Energy Conservation in the Context of a Housing Rehabilitation.
Final rept.,
Jan 77, 67p HUD-0000361
Contract HUD-H-2332R

The Boston Energy Conservation Project, which is discussed in this report, assumed that locally conducted residential energy conservation programs are a significant and appropriate complement to energy conservation programs at the national level. The project involved computer analysis of individual home heating situations and provided dollar calculations of savings possible through a variety of energy conservation steps. The salient feature of the project was its association with an existing home improvement program, which not only served to maximize the value of community development dollars invested, but also provided an important counselor - homeowner contact. This personal contact contributed significantly to homeowner participation in the personalized cost - benefit analysis which was the substance of the project. A relatively simple computer program was designed to permit savings estimates based on homeowner - supplied information. Student energy counselors were employed to administer the energy conservation questionnaire through personal contact with homeowners. The project demonstrated that personal contact in the context of a well - publicized, well - received housing improvement program can significantly increase citizen willingness to consider energy - saving home improvements; however, once a citizen has filled out a home - heating questionnaire and has received a cost / benefit analysis, the chances of subsequent energy saving home improvement actions are fairly uniform, whether or not the initial participation stage involved assistance. The appendices contain samples of forms used in the project, and a brief bibliography is included.

PB80-802051 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Cryogenic Refrigeration. Volume 3. November, 1977-November, 1979 (A Bibliography with Abstracts).
Rept. for Nov 77-Nov 79,
William E. Reed. Dec 79, 134p
Supersedes NTIS/PS-78/1262, NTIS/PS-77/1158, NTIS/PS-76/0871, and NTIS/PS-75/826. See also Volume 1, 1964-1972, NTIS/PS-75/825 and Volume 2, 1973-October, 1977, NTIS/PS-78/1261.

Topics in the cited reports include cryogenic cooling of electronic equipment, infrared equipment, cryogenic storage vessels, magnetohydrodynamic generators, and superconducting magnets, coils, rotating machinery, and transmission lines. Marine refrigeration of liquefied natural gas, cryogenic heat pipes, cryogenic heat transfer, and space applications are studied. Methods investigated include adiabatic demagnetization, electrocaloric effect, Joule-Thomson effect, thermoelectric cooling, and Crayton, Claude, Gifford-McMahon, Sterling, and Vuilleumier cycles. (This updated bibliography contains 125 abstracts, 48 of which are new entries to the previous edition.)

PB80-802747 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Swimming Pool Design, Construction, and Operation (Citations from the Engineering Index Data Base).
Rept. for 1970-Nov 79,
Audrey S. Hundemann. Dec 79, 171p
Supersedes NTIS/PS-78/1272 and NTIS/PS-77/1138.

Design, construction, and operation of both indoor and outdoor swimming pools are discussed in abstracts from worldwide literature. Lighting, ventilation, dehumidification, filtration, chemical water treatment, and heating by electricity, gas, heat pumps, and solar energy are covered. (This updated bibliography contains 165 abstracts, 15 of which are new entries to the previous edition.)

SIB-R-77-1978 PC **A05**/MF **A01**
National Swedish Inst. for Building Research, Stockholm.
Evaluation of an Energy Conserving Ventilation System with Laminar Air Flow and a General Study of the Principle.
K. Belin. 1978, 90p
In Swedish.
U.S. Sales Only.

The function of laminar air flow ventilation systems has been studied as well as the possibilities to save energy by applying the system. The system is described and experimental results of the investigations of the importance of the sizes of different factors for the efficiency of the system are presented in curves. (ERA citation 04:051849)

SIB-T-13-1978 PC **A06**/MF **A01**
National Swedish Inst. for Building Research, Stockholm.
Sun, Air and Heat. Experiences from the Planning and Building of a House with a Low Energy Consumption.
H. Eek. 1978, 105p
In Swedish.
U.S. Sales Only.

The planning and building of an energy saving house well adapted to the environment are described. The certain problems, which appeared due to the new techniques applied in this project, are discussed. (ERA citation 04:050271)

SOLAR/0801-79/01 PC **A03**/MF **A01**
Ehrenkrantz Group, New York.
Architectural Concerns in Solar System Design and Installation.
S. Weinstein. Mar 79, 34p
Contract EG-77-C-01-2522

This report articulates the physical (rather than the mechanical or electrical) aspects involved in the

design and installation of solar systems. It also addresses the typical physical factors and problems encountered in design. In addition, it comments upon the cost effectiveness of various approaches. This report discusses design characteristics of the collector and storage loops, using existing technology, and is unrelated to the specific application of the solar energy collected (i.e., the demand loop - whether domestic hot water (DHW), heating, or cooling - is not covered in this report). Rather, it discusses DOE's specific experience relative to what solar designers nationwide are designing in the installation of solar collectors, array structures, piping and storage equipment, with particular emphasis on cost-effective alternatives. (ERA citation 04:049745)

STUDSVIK/ES-78/81 PC **A06**/MF **A01**
Studsvik Energiteknik AB, Nykoping (Sweden).
Hyro-Powered Heat Pumps: A Pilot Study.
G. Ernstson. 14 Jun 78, 101p
In Swedish.
U.S. Sales Only.

An economic and technical estimation of the conditions for hydro-powered heat pumps, i.e., using hydraulic turbines to drive heat pump compressors, is given. Possible locations for such plants for district heating are also discussed. (ERA citation 04:051880)

13B. Civil Engineering

AD-A075 687/4 PC **A04**/MF **A01**
New York State Dept of Environmental Conservation Albany
National Dam Safety Program. Yankee Lake Dam (NY 332), Delaware River Basin, Sullivan County, New York. Phase I Inspection Report,
George Koch. 10 Jul 79, 61p
Contract DACW51-79-C-0001

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization. Yankee Lake Dam did not reveal any conditions which pose an immediate threat to life or property. However, a seepage problem at the toe of the dam must be corrected. Additionally, monitoring of settlement (currently inactive) and removal of vegetation were recommended. (Author)

AD-A075 728/6 PC **A07**/MF **A01**
Army Engineer Waterways Experiment Station Vicksburg Ms Hydraulics Lab
Los Angeles and Long Beach Harbors Model Study: Report 6. Resonant Response of the Modified Phase I Plan.
Technical rept.,
Douglas G. Outlaw. Aug 79, 139p Rept no. WES-HL-75-4-6

A study of harbor resonance due to long-period wave excitation was conducted in Los Angeles and Long Beach Harbors hydraulic model for the Modified Phase I improvement plan and compared with resonant response for existing conditions. Proposed improvements for the Modified Phase I plan included dredging of navigation channels and an associated landfill of approximately 200 acres in the Port of Los Angeles, and an Outer Harbor Oil Terminal in the Port of Long Beach. Wave periods ranging from 15.5 to 410 sec with incident direction of approach from the south were included int he study. Previous refraction studies had shown that due to offshore topography, Los Angeles and Long Beach Harbors are well protected from all incident long-period wave directions, except from the south. Results of the study show wave-height amplification, periods of maximum response, and modes of oscillation for various berthing areas. Comparisons of model data for existing conditions and the proposed plan indicated that resonant modes of oscillation in the existing harbor berthing areas were not substantially altered. With the Modified Phase I plan, periods of maximum resonant amplification in existing harbors generally shifted slightly. Resonant peaks in the amplification data generally decreased or increased slightly. For existing conditions, periods of maximum response agreed closely with prototype measurements. In the proposed Outer Harbor Oil Terminal, modes of oscillation either resulted in antinodes in the berthing areas or had relatively low amplification. (Author)

AD-A075 729/4 PC **A05**/MF **A01**
Army Engineer Waterways Experiment Station Vicksburg Ms Geotechnical Lab
Engineering Geology and Geomorphology of Streambank Erosion. Report 1. Eel River Basin, California.
Technical rept. Jun 77-Aug 78,
Lawson M. Smith , and David M. Patrick. Sep 79, 83p Rept no. WES-GL-79-7

Streambank erosion, including other fluvial modifications, has occurred in the delta region of the Eel River in Humboldt County, California. Two streambank erosion control demonstration sites have been proposed in order to alleviate the loss of property and to evaluate new techniques for bank protection. The purpose of this report was to analyze, describe, and document the factors and causes of streambank erosion in the Eel River delta. The Eel River Basin occupies an area of 3625 square miles and has a length of 120 miles from the river's source on Bald Mountain in Mendocino County to its mouth in the delta region of Humboldt County. With the exception of the delta, all of the basin lies in the rugged and steep coastal ranges of California. The natural environmental conditions present in the basin were found to be conducive to high sediment yields. The conditions included steep slopes, high relief, thin soil cover, and steeply dipping, folded and fractured bedrock. Land use activities, such as grazing, timber harvesting, and road building, were also found to be contributors of high sediment yields. The causes of bank erosion in the delta are believed to be due to the influence of man's activities in an environment that is already predisposed to high sediment production.

AD-A075 739/3 PC **A03**/MF **A01**
Civil Engineering Lab (Navy) Port Hueneme Ca
Shrinkage-Compensating Cement for Airport Pavement. Phase 2,
John R. Keeton. Sep 79, 43p CEL-TN-1561, FAA-RD-79-11
Contract DOT-FA75WAI-530

Details of a research study on shrinkage-compensating concrete for airport pavements are presented. A total of 53 slab-type prisms 1 foot square and 8, 12, 16, or 20 inches thick were subjected to shrinkage, cooling, and heating. Concrete compressive stresses induced by expansion were calculated, as well as residual compressive stresses after losses due to shrinkage and cooling. The residual concrete compressive stresses, coupled with results from previous field applications of shrinkage-compensating concrete, are used as a basis for recommendation of transverse joint spacings up to 200 feet. (Author)

AD-A075 777/3 PC **A16**/MF **A01**
Army Engineer Waterways Experiment Station Vicksburg Ms Hydraulics Lab
San Juan National Historic Site, San Juan, Puerto Rico; Design for Prevention of Wave-Induced Erosion; Hydraulic Model Investigation.
Final rept. Dec 77-Jul 79,
Robert R. Bottin, Jr. Sep 79, 357p Rept no. WES-HL-79-15

A 1:75-scale (undistorted) hydraulic model of the San Juan National Historic Site, which included the entire historic site, the entrance to San Jaun Harbor, part of Isla de Cabras, and sufficient offshore area in the Atlantic Ocean to permit generation of the required test waves, was used to investigate the effects of proposed structures on wave attack at the historic site. Proposed improvement plans consisted of the installation of rubble-mound revetments and/or breakwaters on both the ocean and bay sides of El Morro Castle. A 90-ft-long wave generator and an automated data acquisition and control system (ADACS) were utilized in model operation.

AD-A075 779/9 PC **A05**/MF **A01**
Army Engineer Waterways Experiment Station Vicksburg Ms Hydraulics Lab
Floating Breakwater Wave-Attenuation Tests for East Bay Marina, Olympia Harbor, Washington; Hydraulic Model Investigation.
Final rept. Oct 77-Sep 78,
Robert D. Carver. Aug 79, 97p Rept no. WES-HL-79-13

An undistorted-scale hydraulic model study was conducted. Initially, two-dimensional (2-D) flume tests were employed to determine the wave-attenuating properties of four floating breakwater cross sections. Based on results of the 2-D tests and relative costs of the structures, the best plan was selected for three-dimensional (3-D) testing. The 3-D tests investigated the combined effects of angular wave attack, structure alignment, wave transmission, and wave diffraction around the exposed end of the breakwater system. The 2-D tests showed the transmission coefficient (Ct) to be strongly dependent on relative structure width (W/L) and weakly dependent on wave steepness (H/L). Results of the 3-D tests showed that maximum wave-height attenuation was achieved when incident wave crests were at a 15-degree angle relative to the center line of the breakwater. Also, 3-D test data showed that a large decrease in the water depth (from 25 ft to 10 ft) only produced a slight decrease in transmitted wave heights. (Author)

AD-A075 781/5 MF **A01**
New York State Dept of Environmental Conservation Albany
National Dam Safety Program. Wanaksink Lake Dam (Inventory Number NY 330), Delaware River Basin, Sullivan County, New York. Phase I Inspection Report,
George Koch. 17 Apr 79, 75p
Contract DACW51-79-C-0001
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization. Wanaksink Lake Dam was found to be in good condition although some maintenance actions were recommended. (Author)

AD-A075 787/2 PC **A06**/MF **A01**
Army Engineer Waterways Experiment Station Vicksburg Ms Geotechnical Lab
Use of Lime in Levee Restoration.
Final rept. Feb 76-Feb 77,
Frank Charles Townsend. Sep 79, 110p Rept no. WES-GL-79-12

The objectives of this study were to evaluate the feasibility of lime treatment as an alternative design and remedial method for restoration of shallow surface slides, and furnish criteria for mix design, design parameters, and construction procedures. The lime treatment susceptibility of four typical levee slide clays in the Lower Mississippi Valley Division was evaluated by mix design procedures using pH tests and evaluating effects of normal and accelerated (105 F) curing times, immersion, density and water content, and compaction delay on unconfined compression test (UCT) strengths. A mix design procedure for assessing the feasibility of using lime for levee slide restoration was developed. The procedure recommends a 28-day normal average UCT-strength increase of 3.6 tsf and a 24-hr immersion strength of 2.12 tsf at optimum conditions as stabilization criteria where strength and durability are critical. Where only soil modification is desired a minimum plasticity index reduction of 50 percent is deemed acceptable, with 28-day strength increases of 100 percent for semicompaction conditions as an optional criteria for judging lime treatment feasibility.

AD-A075 802/9 MF **A01**
New York State Dept of Environmental Conservation Albany
National Dam Safety Program. St. Josephs Lake Dam (Inventory Number NY-324), Delaware River Basin, Black Brook, Sullivan County, New York. Phase I Inspection Report,
George Koch. 17 Apr 79, 69p
Contract DACW51-79-C-0001
Availability: Microfiche copies only.

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organiza-

tion. St. Joseph's Lake Dam was found to have several deficiencies which require further investigation. Structural stability and seepage investigations should be undertaken. Additional monitoring of seepage and erosion at the spillway was also recommended. (Author)

AD-A075 838/3 PC **A05**/MF **A01**
New York State Dept of Environmental Conservation Albany
National Dam Safety Program. New Rochelle Reservoir Number 1 Dam (Inventory Number NY 20), Hutchinson River Basin, Westchester County, New York. Phase I Inspection Report,
George Koch. 8 Aug 79, 99p
Contract DACW51-79-C-0001

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization. New Rochelle Reservoir No. 1 was judged to be unsafe-non-emergency. Areas of seepage on the downstream toe of the southwestern dike were found. The stability analysis indicates unsatisfactory safety factors under certain loadings, and the spillway is seriously inadequate. (Author)

AD-A075 855/7 MF **A01**
New York State Dept of Environmental Conservation Albany
National Dam Safety Program. Canadice Lake Dam, Inventory Number (NY 443), Genesee River Basin, Ontario County, New York. Phase I Inspection Report,
George Koch. 28 Sep 79, 200p
Contract DACW51-79-C-0001
Availability: Microfiche copies only.

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization. Canadice Lake Dam did not reveal any conditions which pose an immediate threat to life or property. Additional investigations are required due to less than acceptable safety factors under certain loading conditions. Structural modifictions may be needed. Total spillway discharge capacity is sufficient to pass 1/2 PMF, but not whole PMF. Consequently, the spillway capacity is inadequate. Minor deficiencies were noted. (Author)

AD-A075 856/5 MF **A01**
New York State Dept of Environmental Conservation Albany
National Dam Safety Program. Owasco Lake Outlet Dam Inventory Number (NY 776), Oswego River Basin, Cayuga County, New York. Phase I Inspection Report,
George Koch. 25 Sep 79, 144p
Contract DACW51-79-C-0001
Availability: Microfiche copies only.

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization. Owasco Lake Outlet Dam did not reveal any conditions which pose an immediate threat to life or property. Additional studies are recommended. The dam would be overtopped and become unstable by either the PMF or 1/2 the PMF. However, there would be no significantly increased hazard to loss of life downstream as compared to pre-overtopping failure. Minor deficiencies (joint needing repointing, gullies) are noted. (Author)

AD-A075 857/3 MF **A01**
New York State Dept of Environmental Conservation Albany
National Dam Safety Program. Mill Street Dam, Inventory Number (NY 775), Oswego River Basin, Cayuga County, New York. Phase I Inspection Report,
George Koch. 28 Sep 79, 199p
Contract DACW51-79-C-0001
Availability: Microfiche copies only.

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization. Mill Street Dam did not reveal any conditions which pose an immediate threat to life or property. However, and undermining of the downstream apron should be corrected. Additionally, problems such as surface runoff gullies, riprap failure, concrete deterioration, and some debris accumualtion should be remedied. (Author)

AD-A075 858/1 MF **A01**
New York State Dept of Environmental Conservation Albany
National Dam Safety Program. Hemlock Lake Dam, Inventory Number (Ny 477), Genesee River Basin, Livingston County, New York. Phase I Inspection Report,
Geroge Koch. 28 Sep 79, 130p
Contract DACW51-79-C-0001
Availability: Microfiche copies only.

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization. Hemlock Lake Dam did not reveal any conditions which pose an immediate threat to life or property. Total spillway discharge capacity not sufficient to pass RMF. Consequently, spillway capacity is considered inadequate. Several deficiencies noted. (Author)

AD-A075 859/9 MF **A01**
New York State Dept of Environmental Conservation Albany
National Dam Safety Program. Hadlock Pond Dam, Inventory Number (NY 625), Lake Champlain Basin, Washington County, New York. Phase I Inspection Report,
George Koch. 24 Sep 79, 116p
Contract DACW51-79-C-0001
Availability: Microfiche copies only.

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization. Hadlock Pond Dam did not reveal conditions which pose an immediate threat to life or property. Additional studies are recommended. Possible embankment overtopping can result from storms exceeding 13% of PMF. Assuming complete breaching of embankment, water surface levels could reach depths posing significant danger to residents. Consequently the spillway is assessed as unsafe non-emergency (SEE REPORT ASSESSMENT). A detailed emergency operation plan, warning system, and surveillance should be implemented as remedial measures are completed. Additional deficiencies were noted. (Author)

AD-A075 890/4 MF **A01**
New York State Dept of Environmental Conservation Albany
National Dam Safety Program. New Rochelle Reservoir Number 3 Dam, Hutchinson River Basin, Westchester County, New York. Phase 1 Inspection Report,
George Koch. 4 Sep 79, 113p
Contract DACW51-79-C-0001
Availability: Microfiche copies only.

This report provides information and analysis on the physical condition of the dam as the report date. Information and analysis are based on visual inspection of the dam by the performing organization. New Rochelle Reservoir No. 3 did not reveal any conditions which pose an immediate threat to life or property. Additional studies are recommended. It has been determined that the embankment would be overtopped for all storms exceeding 35% of the PMF. Significantly dangerous water surface levels could be reached downstream of the dam if the embankment is completely breached. Consequently, the dam is assessed as unsafe, non-emergency (SEE REPORT ASSESSMENT). An emergency operation plan, warning system, and surveillance should be implemented as remedial measures are completed. Minor deficiencies exist. (Author)

AD-A075 891/2 MF **A01**
New York State Dept of Environmental Conservation Albany
National Dam Safety Program Dashville Dam, Inventory Number (NY 76), Lower Hudson River Basin, Ulster County, New York. Phase 1 Inspection Report,
George Koch. 24 Sep 79, 141p
Contract DACW51-79-C-0001
Availability: Microfiche copies only.

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization. Dashville Dam did not reveal any conditions which pose an immediate threat to life or property. Additional structural stability analysis recommended. Minor deficiencies limited to concrete surface deterioration. Insufficient spillway discharge capacity for passing 1/2 of PMF has deemed spillway inadequate. (Author)

AD-A075 947/2 PC **A05**/MF **A01**
Air Force Engineering and Services Center Tyndall AFB Fl Engineering and Services Lab
Control of Particulate Emissions from Turbine Engine Test Cells by Cooling Water Injection.
Final rept. Feb-May 79,
Michael G. MacNaughton , James J. Tarquinio , and Joseph A. Martone. Jul 79, 77p Rept no. AFESC/ESL/TR-79-19

The operation of DOD turbine engine test cells in California has been criticized by the State environmental regulatory agencies because smoke generated by some engines results in excessive opacity (visibility) of the test cell exhaust plume. Since the plume exceeds visibility standards for only a relatively small proportion of engines tested a low cost control technique which brings the test cell into compliance with opacity standards is required. This study was initiated to verify that, in addition to forming a steam plume, water used to cool the test cell walls also removes engine generated particulates and substantiates this procedure as a legitimate pollution control technique. It can be concluded from this study that water injection as practiced at McClellan AFB test cell results in significant (approx. 50% by weight) control of turbine engine particulate emissions. It is postulated that the process could be made more efficient by the use of better designed spray nozzles which would increase water droplet particle contact and inclusion of a demister to increase water removal from the exhaust.

AD-A076 007/4 PC **A08**/MF **A01**
Army Engineer Waterways Experiment Station Vicksburg Ms Geotechnical Lab
Susceptibility of Dispersive Clay at Grenada Dam, Mississippi, to Piping and Rainfall Erosion.
Final rept. Jan 76-Sep 77,
Edward B. Perry. Sep 79, 163p Rept no. WES-GL-79-14

Past performance of Grenada Dam indicates piping of embankment and foundation soils through joints of the collector pipe for the toe drainage system (prior to its replacement with an open paved ditch in 1961) occurred. Also, rainfall erosion tunnels developed on the downstream slope of the dam, primarily in the valley section between sta 105+00 and 145+00, soon after completion of the main embankment in 1949 and continued to develop at a decreasing rate to the present. Based upon laboratory tests conducted on undisturbed soil samples and reservoir water samples obtained in 1973 and 1976, the embankment soil is nondispersive at the surface and dispersive below a depth of about 6 ft. Limited data obtained below the embankment indicate the foundation soil is dispersive at the surface and nondispersive to dispersive with depth. The Australian method of analysis, using the exchangeable sodium percentage of the soil, total ionic concentration of the reservoir (eroding) water, and predominate clay mineral of the soil, indicates both the embankment and foundation soils would be potentially susceptible to dispersive clay piping if Grenada Dam contained cracks or sandy lenses traversing the width of the dam where the reservoir water would have a path of rapid access across the dam. Since piping failure through the embankment or foundation has not occurred, either the dam is free from cracks or sandy lenses traversing the width of the dam, or if cracks are present, the soil is able to swell and seal the flow channels.

AD-A076 090/0 PC **A03**/MF **A01**
Woodward-Clyde Consultants Chicago Il

Overview of Foundation Investigation and Test Program. Volume I. Existing Locks and Dam Number 26 Mississippi River, Alton, Illinois. Phase IV Report.
Final rept.,
Yves Lacroix , Jean-Yves Perez , and Eugene L. Fieldhammer. 15 Jul 79, 39p
Contract DACW43-78-C-0005
See also Volume 2, AD-A076 091.

A series of tests examining various foundation systems and construction techniques were conducted on Ellis Island near Locks and Dam No. 26 in alluvial sand deposits underlain by glacial deposits and limestone. The chemical grout tests consisted of grouting the upper 20 feet of the alluvial sand by injecting a number of different silicate and cement-bentonite grout types, while varying the grouting method, hole spacing, and injecting rates. Heave, lateral displacement, and pore pressure were monitored during grout injection. The in situ properties of the sand were measured before and after grouting by standard penetration tests, static cone penetration tests, pressuremeter tests, bore hole permeability tests, and shear wave velocity tests. Concurrently laboratory tests were conducted to investigate the strength and creep behavior of the grouted sand. After completion of grouting, the site was excavated to examine and evaluate the grouted sand. In the rock anchor test, inclined rock anchors were installed in limestone through 130 feet of alluvial and glacial deposits using a pneumatic down-the-hole hammer with an offset reamer. Load tests were conducted on three instrumentated rock anchors and the feasibility of installation of the rock anchors was determined by evaluating loss of ground during installation, performance of the installation equipment, and rate of installation. The drilled-in pile tests consisted of installation of large diameter high capacity pipe piles by the Benoto method.

AD-A076 091/8 PC **A13**/MF **A01**
Woodward-Clyde Consultants Chicago Il
Results and Interpretation of Chemical Grouting Test Program. Volume II. Existing Locks and Dam Number 26. Mississippi River, Alton, Illinois. Phase IV Report.
Final rept.,
Jean-Yves Perez , and Yves Lacroix. 15 Jul 79, 299p
Contract DACW43-78-C-0005
See also Volume 2A, Appendices A-G, AD-A076 092.

A series of tests examining various foundation systems and construction techniques were conducted on Ellis Island near Locks and Dam No. 26 in alluvial sand deposits underlain by glacial deposits and limestone. The chemical grout tests consisted of grouting the upper 20 feet of the alluvial sand by injecting a number of different silicate and cement-bentonite grout types, while varying the grouting method, hole spacing, and injecting rates. Heave, lateral displacement, and pore pressure were monitored during grout injection. The in situ properties of the sand were measured before and after grouting by standard penetration tests, static cone penetration tests, pressuremeter tests, bore hole permeability tests, and shear wave velocity tests. Concurrently laboratory tests were conducted to investigate the strength and creep behavior of the grouted sand. After completion of grouting, the site was excavated to examine and evaluate the grouted sand. In the rock anchor test, inclined rock anchors were installed in limestone through 130 feet of alluvial and glacial deposits using a pneumatic down-the-hole hammer with an offset reamer. Load tests were conducted on three instrumentated rock anchors and the feasibility of installation of the rock anchors was determined by eva luating loss of ground during installation, performance of the installation equipment, and rate of installation. The drilled-in pile test consisted of installation of large diameter high capacity pipe piles by the Benoto method.

AD-A076 092/6 PC **A11**/MF **A01**
Woodward-Clyde Consultants Chicago Il
Results and Interpretation of Chemical Grouting Test Program. Existing Locks and Dam Number 26, Mississippi River, Alton, Illinois. Volume IIA. Appendices A through G. Phase IV Report.
Final rept.,
Jean-Yves Perez , and Yves Lacroix. 15 Jul 79, 246p
Contract DACW43-78-C-0005
See also Volume 3, AD-A076 093.

A series of tests examining various foundation systems and construction techniques were conducted on Ellis Island near Locks and Dam No. 26 in alluvial sand deposits underlain by glacial deposits and limestone. The chemical grout tests consisted of grouting the upper 20 feet of the alluvial sand by injecting a number of different silicate and cement-bentonite grout types, while varying the grouting method, hole spacing, and injecting rates. Heave, lateral displacement, and pore pressure were monitored during grout injection. The in situ properties of the sand were measured before and after grouting by standard penetration tests, static cone penetration tests, pressuremeter tests, bore hole permeability tests, and shear wave velocity tests. Concurrently laboratory tests were conducted to investigate the strength and creep behavior of the grouted sand. After completion of grouting, the site was excavated to examine and evaluate the grouted sand. In the rock anchor test, inclined rock anchors were installed in limestone through 130 feet of alluvial and glacial deposits using a pneumatic down-the-hole hammer with an offset reamer. Load tests were conducted on three instrumentated rock anchors and the feasibility of installation of the rock anchors was determined by evaluating loss of ground during installation performance of the installation equipment, and rate of installation. The drilled-in pile tests consisted of installation of large diameter high capacity pipe piles by the Benoto method.

AD-A076 093/4 PC **A20**/MF **A01**
Woodward-Clyde Consultants Chicago Il
Results and Interpretation of Pile Driving Effects Test Program. Existing Locks and Dam Number 26, Mississippi River, Alton, Illinois. Volume III. Phase IV Report.
Final rept.,
Jean-Yves Perez , and D. Michael Holloway. 15 Jul 79, 453p
Contract DACW43-78-C-0005
See also Volume 3A, Appendices H-T, AD-A076 094.

A series of tests examining various foundation systems and construction techniques were conducted on Ellis Island near Locks and Dam No. 26 in alluvial sand deposits underlain by glacial deposits and limestone. The chemical grout tests consisted of grouting the upper 20 feet of the alluvial sand by injecting a number of different silicate and cement-bentonite grout types, while varying the grouting method. hole spacing, and injecting rates. Heave, lateral displacement, and pore pressure were monitored during grout injection. The in situ properties of the sand were measured before and after grouting by standard penetration tests, static cone penetration tests, pressuremeter tests, bore hole permeability tests, and shear wave velocity tests. Concurrently laboratory tests were conducted to investigate the strength and creep behavior of the grouted sand. After completion of grouting, the site was excavated to examine and evaluate the grouted sand. In the rock anchor test, inclined rock anchors were installed in limestone through 130 feet of alluvial and glacial deposits using a pneumatic down-the-hole hammer with an offset reamer. Load tests were conducted on three instrumentated rock anchors and the feasibility of installation of the rock anchors was determined by evaluating loss of ground during installation performance of the installation equipment, and rate of installation. The drilled-in pile tests consisted of installation of large diameter high capacity pipe piles by the Benoto method.

AD-A076 094/2 MF **A01**
Woodward-Clyde Consultants Chicago Il
Results and Interpretation of Pile Driving Effects Test Program Existing Locks and Dam number 26, Mississippi River, Alton, Illinois. Volume IIIA. Appendices H through T. Phase IV Report.
Final rept.,
Jean-Yves Perez , and D. Michael Holloway. 15 Jul 79, 557p
Contract DACW43-78-C-0005
See also Volume 4, AD-A076 095.
Availability: Microfiche copies only.

A series of tests examining various foundation systems and construction techniques were conducted on Ellis Island near Locks and Dam No. 26 in alluvial sand deposits underlain by glacial deposits and limestone. The chemical grout tests consisted of grouting the upper 20 feet of the alluvial sand by injecting a number of different silicate and cement-bentonite grout types, while varying the grouting method, hole spacing, and injecting rates. Heave, lateral displacement, and pore pressure were monitored during grout injection. The in situ properties of the sand were measured before and after grouting by standard penetration tests, static cone penetration tests, pressuremeter tests, bore hole permeability tests, and shear wave velocity tests. Concurrently laboratory tests were conducted to investigate the strength and creep behavior of the grouted sand. After completion of grouting, the site was excavated to examine and evaluate the grouted sand. In the rock anchor test, inclined rock anchors were installed in limestone through 130 feet of alluvial and glacial deposits using a pneumatic down-the-hole hammer with an offset reamer. Load tests were conducted on three instrumentated rock anchors and the feasibility of installation of the rock anchors was determined by evaluating loss of ground during installation performance of the installation equipment, and rate of installation. The drilled-in pile tests consisted of installation of large diameter high capacity pipe piles by the Benoto method.

AD-A076 095/9 PC **A07**/MF **A01**
Woodward-Clyde Consultants Chicago Il
Results and Interpretation of Drilled-in Pile Test Program. Existing Locks and Dam Number 26, Mississippi River, Alton, Illinois. Volume IV. Phase IV Report.
Final rept.,
Jean-Yves Perez , and Stanley F. Gizienski. 15 Jul 79, 139p
Contract DACW43-78-C-0005
See also Volume 4A-App-A-D, AD-A076 096.

A series of tests examining various foundation systems and construction techniques were conducted on Ellis Island near Locks and Dam No. 26 in alluvial sand deposits underlain by glacial deposits and limestone. The chemical grout test consisted of grouting the upper 20 feet of the alluvial sand by injecting a number of different silicate and cement-bentonite grout types, while varying the grouting method, hole spacing, and injecting rates. Heave, lateral displacement, and pore pressure were monitored during grout injection. The in situ properties of the sand were measured before and after grouting by standard penetration tests, static cone penetration tests, pressuremeter tests, bore hole permeability tests, and shear wave velocity tests. Concurrently laboratory tests were conducted to investigate the strength and creep behavior of the grouted sand. After completion of grouting, the site was excavated to examine and evaluate the grouted sand. In the rock anchor test, inclined rock anchors were installed in limestone through 130 feet of alluvial and glacial deposits using a pneumatic down-the-hole hammer with an offset reamer. Load tests were conducted on three instrumentated rock anchors and the feasibility of installation of the rock anchors was determined by evaluating loss of ground during installation performance of the installation equipment, and rate of installation. The drilled-in pile test consisted of installation of large diameter high capacity pipe piles by the Benoto method.

AD-A076 096/7 PC **A10**/MF **A01**
Woodward-Clyde Consultants Chicago Il
Results and Interpretation of Drilled-in Pile Test Program. Existing Locks and Dam Number 26, Mississippi River, Alton, Illinois. Volume IVA. Appendices A through D. Phase IV Report.
Final rept.,
Jean-Yves Perez , and Stanley F. Gizienski. 15 Jul 79, 215p
Contract DACW43-78-C-0005
See also Volume 5, AD-A076 097.

A series of tests examining various foundation systems and construction techniques were conducted on Ellis Island near Locks and Dam No. 26 in alluvial sand deposits underlain by glacial deposits and limestone. The chemical grout test consisted of grouting the upper 20 feet of the alluvial sand by injecting a number of different silicate and cement-

bentonite grout types, while varying the grouting method, hole spacing, and injecting rates. Heave, lateral displacement, and pore pressure were monitored during grout injection. The in situ properties of the sand were measured before and after grouting by standard penetration tests, static cone penetration tests, pressuremeter tests, bore hole permeability tests, and shear wave velocity tests. Concurrently laboratory tests were conducted to investigate the strength and creep behavior of the grouted sand. After completion of grouting, the site was excavated to examine and evaluate the grouted sand. In the rock anchor test, inclined rock anchors were installed in limestone through 130 feet of alluvial and glacial deposits using a pneumatic down-the-hole hammer with an offset reamer. Load tests were conducted on three instrumentated rock anchors and the feasibility of installation of the rock anchors was determined by evaluating loss of ground during installation, performance of the installation equipment, and rate of installation. The drilled-in pile test consisted of installation of large diameter high capacity pipe piles by the Benoto method.

AD-A076 097/5 PC **A06**/MF **A01**
Woodward-Clyde Consultants Chicago Il
Results and Interpretation of Rock Anchor Test Program. Existing Locks and Dam Number 26, Mississippi River, Alton, Illinois. Volume V. Phase IV Report.
Final rept.,
Jean-Yves Perez , and Ralph A. Fasano. 15 Jul 79, 123p
Contract DACW43-78-C-0005
See also Volume 5A-App-A-E, AD-A076 098.

A series of tests examining various foundation systems and construction techniques were conducted on Ellis Island near Locks and Dam No. 26 in alluvial sand deposits underlain by glacial deposits and limestone. The chemical grout test consisted of grouting the upper 20 feet of the alluvial sand by injecting a number of different silicate and cement-bentonite grout types, while varying the grouting method, hole spacing, and injecting rates. Heave, lateral displacement, and pore pressure were monitored during grout injection. The in situ properties of the sand were measured before and after grouting by standard penetration tests, static cone penetration tests, pressuremeter tests, bore hole permeability tests, and shear wave velocity tests. Concurrently laboratory tests were conducted to investigate the strength and creep behavior of the grouted sand. After completion of grouting, the site was excavated to examine and evaluate the grouted sand. In the rock anchor test, inclined rock anchors were installed in limestone through 130 feet of alluvial and glacial deposits using a pneumatic down-the-hole hammer with an offset reamer. Load tests were conducted on three instrumentated rock anchors and the feasibility of installation of the rock anchors was determined by evaluating loss of ground during installation, performance of the installation equipment, and rate of installation. The drilled-in pile test consisted of installation of large diameter high capacity pipe piles by the Benoto method.

AD-A076 098/3 MF **A01**
Woodward-Clyde Consultants Chicago Il
Results and Interpretation of Rock Anchor Test Program. Existing Locks and Dam Number 26, Mississippi River, Alton, Illinois. Volume VA. Appendices A through E. Phase IV Report.
Final rept.,
Jean-Yves Perez , and Ralph A. Fasano. 15 Jul 79, 198p
Contract DACW43-78-C-0005
See also Volume 1, AD-A076 090.
Availability: Microfiche copies only.

A series of tests examining various foundation systems and construction techniques were conducted on Ellis Island near Locks and Dam No. 26 in alluvial sand deposits underlain by glacial deposits and limestone. The chemical grout test consisted of grouting the upper 20 feet of the alluvial sand by injecting a number of different silicate and cement-bentonite grout types, while varying the grouting method, hole spacing, and injecting rates. Heave, lateral displacement, and pore pressure were monitored during grout injection. The in situ properties of the sand were measured before and after grouting by standard penetration tests, static cone penetration tests, pressuremeter tests, bore hole permeability tests, and shear wave velocity tests. Concurrently laboratory tests were conducted to investigate the strength and creep behavior of the grouted sand. After completion of grouting, the site was excavated to examine and evaluate the grouted sand. In the rock anchor test, inclined rock anchors were installed in limestone through 130 feet of alluvial and glacial deposits using a pneumatic down-the-hole hammer with an offset reamer. Load tests were conducted on three instrumentated rock anchors and the feasibility of installation of the rock anchors was determined by evaluating loss of ground during installation, performance of the installation equipment, and rate of installation. The drilled-in pile test consisted of installation of large diameter high capacity pipe piles by the Benoto method.

AD-A076 113/0 PC **A04**/MF **A01**
Army Engineer Topographic Labs Fort Belvoir Va
The Use and Calibration of Distance Measuring Equipment for Precise Mensuration of Dams. Revised,
Kenneth D. Robertson. Jun 79, 73p Rept no. ETL-0190
Revision of Rept. no. ETL-0048 dated Mar 76, AD-A023 759.

This report is intended as a practical guide to land surveyors who use distance measuring equipment (DME) for making precise measurements of movements in dams and other large structures. The report consists of two parts: First, DME calibration, error sources, atmospheric corrections and correct use; Second, special techniques of trilateration and data reduction for precise mensuration on dams. This revised report contains several new sections dealing with error estimation, adjustment, and refractive index corrections. (Author)

AD-A076 166/8 MF **A01**
New York State Dept of Environmental Conservation Albany
National Dam Safety Program. Finch Hollow Watershed Project, Site 1. Inventory Number NY-697 Susquehanna River Basin. Broome County, New York. Phase I Inspection Report,
George Koch. Aug 79, 97p
Contract DACW51-79-C-0001
Availability: Microfiche copies only.

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization. Finch Hollow Project-Site 1 did not reveal conditions which pose a hazard to humanlife or property. Total spillway discharge capacity is adequate for the PMF. An immediate investigation is required to ascertain the flooding potential of homes located between the dam and the highway embankment. Subsequent remedial measures must be completed within 1 year of notification. Several remedial actions during construction season are required. (Author)

AD-A076 205/4 PC **A06**/MF **A01**
Army Engineer Div North Pacific Bonneville Or Div Hydraulic Lab
Navigation Lock for Lower Granite Dam, Snake River, Washington. Hydraulic Model Investigations.
Final rept.
Sep 79, 110p Rept no. TR-126-1

The Lower Granite navigation lock is designed for maximum, average, and minimum lifts of 105, 100, and 87 ft, respectively. The filling and emptying systems are dynamically balanced hydraulic systems that include a unique arrangement of eight longitudinal floor culverts symmetrically placed around the center of the 86- by 675-ft lock chamber. Portions of the forebay and tailrace, two adjacent spillway bays, and elements of the lock chamber and hydraulic system were reproduced in a 1:25-scale model. Tests of the proposed system indicated that turbulence and longitudinal hawser forces on barge tows in the lock chamber were excessive with a 4.0-min valve schedule at the design head of 105 ft. Pressures on the culvert roofs downstream from the filling valves were satisfactory when both valves were operated. With one valve, the minimum instantaneous pressure was -19 ft of water. Revised ports and baffles along the walls and over the ports were developed to reduce turbulence in the lock. Average maximum hawser forces of 6.2 tons on an eight-barge, 9-ft-draft tow and 9.9 tons on a four-barge tow in the original design lock were reduced to 1.4 and 1.7 tons, respectively, in the final design. A filling time of 9.8 min was obtained with a 1.11-min valve period and still maintained acceptable flow conditions, pressures, and hawser forces.

AD-A076 220/3 PC **A02**/MF **A01**
Army Engineer Waterways Experiment Station Vicksburg Ms Structures Lab
Grouting Instrumentation, Old River Low Sill Control Structure.
Final rept.,
Donnie L. Ainsworth. Sep 79, 20p Rept no. WES-SL-79-23

Instrumentation was developed and used in the field to monitor the presence and flow of grout during remedial grouting of the Old River Low Sill Control Structure. Measurements were also made of uplift pressures by means of transducers installed in packers in drilled holes through the slab. This report presents information on the development and field use of instruments to detect the presence of grout, the rate of buildup under the base of the structure, and pressure increase under the slab due to grouting operations. All data were electronically recorded and were used extensively to regulate the grouting operation. (Author)

AD-A076 257/5 PC **A04**/MF **A01**
Dayton Univ Ohio
Probe Effects in Gas Turbine Combustor Emissions Measurements.
Final rept. 1 Mar-1 Oct 78,
J. A. Clark , J. E. Peters , and A. M. Mellor. Jun 79, 61p AFAPL-TR-79-2041
Contract F33615-77-C-2069
Prepared in cooperation with Purdue Univ., Lafayette, IN. Combustion Lab., Rept. No. PURDU-CL-78-05.

Four geometrically distinct, stainless steel probes are used to study the concentrations of CO, HC,, NO, and NOX at several different radial and two different axial positions within a simplified gas turbine combustor. The probes are all water cooled but do not employ an aerodynamic quench. They are designed to assess the effect of tip shape, tip to body proximity, and probe entry point on measured pollutant concentrations. Though probe entry point and tip to body proximity are shown to imperceptibly affect the pollutant concentrations, probe tip geometry has a marked impact on the measured pollutant levels. Specifically, the aerodynamic, tapered-tip probe yields depressed CO and HC, and elevated NO concetrations compared to other three blunt-tipped probes. Regarding reproducibility, the pollutant concentratins measured with one of the blunt-tipped probes in this study are compared to pollutant levels measured with the same probe three years ago Tuttle, et al. 1975). CO and HC are shown to be the most reproducible species, while NO and NOX acceptably but less accurately agree with past studies. (Author)

AD-A076 266/6 PC **A03**/MF **A01**
New Mexico State Univ Las Cruces Physical Science Lab
Concept Development of Automatic Instrumentation for Monitoring Movements of DAMS,
Joel B. Smith , and Sharon McAllister. 28 May 79, 47p ETL-0187
Contract DAAK70-78-C-0218

A study was undertaken to determine a method or methods for monitoring movements of large concrete dams. A fully automated instrument system based on this method was to be designed for use in dam failure monitoring. A literature search for possible methods and comparison of capabilities including atmospheric refraction error modeling of optical systems lead to the selection of laser ranging as the best method for measuring dam deflection. The system developed consists of a laser range meter pointed at an array of retroflectors on the dam by a computer controlled azimuth-elevation instrumentation mount. The computer also handles data collection and correction and reports to a remote terminal at the dam operator's site. (Author)

AED-Conf-77-316-001 PC **A02**/MF **A01**
Central Electricity Generating Board, London (England).
Processing of River Water by Reverse Osmosis.
N. J. Ray, M. A. Jenkins, and A. Coates. 1977, 15p CONF-7710142-1
In German.Chemistry in power stations, Essen, F.R. Germany, 26 Oct 1977.
U.S. Sales Only.

Experimental studies are reported on the purification of water from the Trent River using reverse osmosis systems with cellulose acetate membranes in tubular or coiled form and polyamide membranes as hollow threads. All three membranes would produce water of satisfactory quality when it was a question of removal of inorganic material. The tubular membrane had the best performance for polluted low-quality water since chemical and physical purification methods could be used sequentially to obtain the water quality desired. The hollow-thread system easily became plugged and therefore was unsuitable. The coiled modules were more sensitive than the tubular form, but were subject to operational failures. No cost advantage was obtained with reverse osmosis. The use of the method should be limited to water difficult to purify. (ERA citation 04:004440)

ANL/EES-TM-54 PC **A08**/MF **A01**
Argonne National Lab., IL.
Issues Relating to New Source Performance Standards for Industrial Steam Generators.
D. G. Streets, and T. A. Speciner. Jun 79, 155p
Contract W-31-109-ENG-38

Issues relating to the revision of New Source Performance Standards (NSPS) for industrial boilers are identified. The objective is to provide information for the Department of Energy in order that it can participate productively in this standard-setting activity. The study had the following aims: to review the existing data relevant to industrial NSPS; to draw up possible regulatory alternatives; to project the effects of these regulatory alternatives; to identify issues that may be of concern to the Department of Energy; and to suggest areas for additional work. This is not a technology evaluation, nor a work plan for the Department of Energy. However, the items reported should be useful in identifying the technical issues that need to be resolved and in guiding further analysis by the Department of Energy. (ERA citation 04:049855)

ANL/EES-TM-56 PC **A05**/MF **A01**
Argonne National Lab., IL.
Environmental Evaluation of the PIES Trendlong Mid-Mid Scenario: Federal Region VII.
Jul 79, 92p
Contract W-31-109-ENG-38

Findings of the environmental impact evaluation of the PIES TRENDLONG MID-MID Scenario for Federal Region VII (Iowa, Kansas, Nebraska, and Missouri) are reported. Projected coal-fired utility expansion could be constrained in several areas because of projected TSP and SO sub 2 National Ambient Air Quality Standards (NAAQS) violations. Problems will be most pronounced in Iowa and Kansas, but could be incurred in any state in the region. Large coal and nuclear facilities projected for parts of Region VII may experience water availability problems. The Smokey Hill River in Kansas, the Skunk River in Iowa, and the Platte River in Nebraska may have limited water supplies for operating the projected increases in fossil fuel and nuclear generating facilities. Coal surface mining in Missouri (21,000 acres may be disturbed from 1975 to 1990) may create land-use conflicts. Region VII may not have the facilities or legal framework for mitigating the negative socioeconomic impacts that are projected to occur from the proposed energy development. Therefore, the potential for severe and pervasive socioeconomic impacts is great. (ERA citation 04:055552)

BNL-50815 PC **A04**/MF **A01**
Energy Systems Research Group, Inc., Albany, NY.
Effect on Air and Water Emissions of Energy Conservation in Industry.
P. D. Raskin, and R. A. Rosen. Jul 77, 74p
Contract EY-76-C-02-0016

Environmental emissions for five large energy-consuming industries plus others are estimated for four US energy system scenarios for 1985 and 2000. Emissions are estimated by specifying fuel mixes to steam boilers and direct heat, combustion efficiencies, shifts in the relative shares of alternative industrial processes use of industrial cogenerators, and penetration of pollution-control technologies. Analyses show that emissions do not vary significantly among scenarios principally because of increased coal use and the reduced penetration rate of advanced pollution-control technologies in the low-energy-demand scenarios. Within scenarios, emissions from the chemical and iron and steel subsectors dominate all aggregate estimates. Hydrocarbon and carbon monoxide process emission coefficients for the chemical subsector must be improved. (ERA citation 04:053703)

CONF-780802-10 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Translating Annual Electrical Generation Demand into Peak Demand Using Hourly Load Variation.
J. L. Trimble. Sep 78, 15p
Contract W-7405-ENG-26
American Statistical Association meeting, San Diego, CA, USA, 14 Aug 1978.

A model is described that uses annual demand forecasts to produce forecasts of peak-load demand as well as the corresponding load-duration function. The model is described in terms of electricity demand but need not be confined to that application. The model is developed around the load-duration function, an important planning tool in the electric utility industry. The essence of the model is that it models hourly variation in electricity loads per year as they vary over time. This is accomplished by exploiting the close relationship between the load-duration function, the probability distribution of loads, and peak demand. Using annual observations of total demand and the corresponding observations of hourly loads for each utility system, the hourly variation in loads is characterized in terms of the year-to-year variation of the first moment of a hypothetical probability density function which approximates the empirical distribution of loads. By imposing certain restrictions, estimates of the parameters of the hypothetical distribution are calculated. That distribution can then be translated into a load-duration function. Preliminary empirical results are presented for two utility systems in the northeastern United States. (ERA citation 04:026787)

CONF-790499-2 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Metal Removal from Coal Ashes and Wastes.
R. M. Canon, A. D. Kelmers, W. J. McDowell, F. G. Seeley, and J. S. Watson. 1979, 16p
Contract W-7405-ENG-26
American Society of Civil Engineers Power Research Council/Electric Power Research Institute workshop, San Diego, CA, USA, 23 Apr 1979.

Laboratory-scale tests and preliminary engineering economic analyses have been performed to evaluate several processes for the recovery of aluminum and other metals from fly ash. Preliminary tests have also been made on two coal conversion ashes. The processes examined include: direct acid leach, lime-sinter, lime-soda sinter, and two new sinter-leach processes (calsinter and salt-soda sinter). The Calsinter process involves sintering with limestone and gypsum or flue gas desulfurization sludge at 1000 to 1200 exp 0 C, followed by sulfuric acid leaching. Each of the new sinter-leach processes recovers more than 95% of the aluminum along with substantial percentages of the other metals present. The recovered metals can be converted to a number of potentially saleable products. (ERA citation 04:053410)

CONF-790638-5 PC **A02**/MF **A01**
Argonne National Lab., IL.
Potential Water Quality Impacts from Large Scale Crop Residue Harvesting.
M. F. Torpy, L. J. Habegger, S. Y. Chiu, and S. Barisas. 1979, 5p
Contract W-31-109-ENG-38
Annual biomass energy systems conference, Golden, CO, USA, 5 Jun 1979.

The design methodology and some of the results of a study on the location in the conterminous US and effects of substituting solar for coal energy is described. A scenario similar to a maximum solar penetration scenario is addressed and the relative increases in sheet erosion with and without biomass residue harvesting are evaluated. Changes in erosion is projected by using the Universal Soil Loss Equation. Some results are described in relation to the continuing studies which will address comparisons between coal and solar erosion and water quality impacts. (ERA citation 04:052797)

COO-4017-3 PC **A15**/MF **A01**
Colorado Univ., Boulder.
Trace Elements in Oil Shale. Progress Report, 1976—1979.
W. R. Chappell. 1979, 333p
Contract EY-76-S-02-4017

The overall objective of the program is to evaluate the environmental and health consequences of the release of toxic trace elements (As, B, F, Mo, Se) by shale oil production and use. Some of the particularly significant results are: The baseline geochemical survey shows that stable trace elements maps can be constructed for numerous elements and that the trends observed are related to geologic and climatic factors. Shale retorted by above-ground processes tends to be very homogeneous (both in space and in time) in trace element content. This implies that the number of analytical determinations required of processed shales is not large. Leachate studies show that significant amounts of B, F, And Mo are released from retorted shales and while B and Mo are rapidly flushed out, F is not. On the other hand, As, Se, and most other trace elements ae not present in significant quantities. Significant amounts of F and B are also found in leachates of raw shales. Very large concentrations of reduced sulfur species are found in leachates of processed shale. Upon oxidation a drastic lowering in pH is observed. Preliminary data indicates that this oxidation is catalyzed by bacteria. Very high levels of B and Mo are taken up in some plants growing on processed shale with and without soil cover. These amounts depend upon the process and various site specific characteristics. In general, the amounts taken up decrease with increasing soil cover. On the other hand, we have not observed significant uptake of As, Se, and F into plants. There is a tendency for some trace elements to associate with specific organic fractions, indicating that organic chelation or complexation may play an important role. In particular, most of the Cd, Se, and Cr in shale oil is associated with the organic fraction containing most of the nitrogen-containing compounds. (ERA citation 04:048154)

COO-4553-2(V.1) PC **A05**/MF **A01**
Pennsylvania Engineering Corp., Pittsburgh. Engineering Construction Div.
Dry Coke Quenching Final Project Report for Brown's Island Coke Plant, Weirton, West Virginia. Volume 1. Phase 1 Engineering.
Aug 78, 80p
Contract EC-77-C-02-4553

The subject of this report is the installation of a Dry Coke Quenching plant at National Steel's Brown's Island site. Although the technology of DCQ is not new, it has undergone much development and application in recent years to provide a process to: (1) recover the useful energy from the hot coke discharged from the coke-ovens; and (2) reduce the reported high levels of pollution from conventional quenching of hot coke using open water sprays. Although several modern installations have been built in the USSR and Japan, none has been built in the USA. With the sharply increasing prices of fuel and increasingly stringent environmental standards in the USA, the re-introduction of DCQ represents a double benefit for which the National Steel Plant will be a timely demonstration. (ERA citation 04:048039)

DOE/EA-0025 PC **A05**/MF **A01**
Department of Energy, Bartlesville, OK. Bartlesville Energy Research Center.
Environmental Assessment: Land Acquisition and Facility Construction.
Mar 78, 80p

Bartlesville Energy Research Center (BERC), Bartlesville, Oklahoma, has been faced with major problems in the past over the physical locations of

some buildings at the Center. The buildings include a fuel/engine testing laboratory and a site for storing highly flammable petroleum fuels. The proposed solution by the BERC management is to acquire two blocks of land adjacent to the northern boundary and relocate the two problematic facilities at the new site. This action would minimize the high noise levels and fire hazards to the community by relocating both the fire hazard and the noise source at distances farther from the densely populated areas. Additional precautions are also planned. This report examines the existing baseline data and assesses the associated environmental impacts due to the proposed expansion of the Bartlesville Energy Research Center. No significant long-range environmental impact could be identified. (ERA citation 04:050601)

DOE/EDP-0038 PC **A04**/MF **A01**
Department of Energy, Washington, DC.
Environmental Development Plan: Electric Energy Systems.
Aug 79, 58p

The Environmental Development Plan system is designed to provide a common basis for planning, managing, and reviewing the environmental aspects of the various energy technology programs under DOE's jurisdiction. This EDP addresses the Electric Energy Systems Program, which includes the following programs: electric field effects, underground transmission, high-voltage dc technology, advanced transformer and generator concepts, compact stations, dispersed storage and generation, load management, distribution automation, and complex-systems control. The last three are analytical in nature, and there are no identifiable environmental impacts presently associated with them; thus, they are excluded from this EDP. The remaining technologies are described in Section II. The key projects have been examined in detail to identify their environmental impact and the resulting concerns. The results of these analyses are given in Section III. In Section IV, the management plan for meeting the environmental requirements is identified, along with the organizations responsible for managing the environmental research associated with the EES program. (ERA citation 04:055096)

DOE/EDP-0039 PC **A05**/MF **A01**
Department of Energy, Washington, DC.
Environmental Development Plan: Industrial Programs.
Jul 79, 94p

The Environmental Development Plan system is designed to provide a common basis for planning, managing, and reviewing the environmental aspects of the various energy-technology programs under DOE jurisdiction. An EDP is expected to identify and evaluate the environmental concerns; define general requirements for environmental, health, and safety research and impact assessments; provide a coordinated timing schedule for required environmental research and development, technology program activities, and decision points; and indicate approximate time for documents required in the National Environmental Policy Act process and Environmental Readiness Documents, where appropriate. This EDP addresses the Industrial Energy Conservation Program in the following activities: high-temperature processes, low-temperature and manufacturing processes, waste-energy utilization and cogeneration, alternative-materials utilization, and agriculture and food processes. (ERA citation 04:053408)

DOE/EIA-0010/1 PC **A02**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
EIA Report on Monthly Comparisons of Peak Demands and Energy for Load: 1972 to 1976.
23p

Growth in net energy for load and peak demand for the year 1976 was considerably greater than that experienced during the two-year period subsequent to 1973, though still below historic growth rates. Summary tables from electric utility systems of net energy for load and peak demand for each of the eight DOE statistical regions for the 1972 to 1976 period are given. Historically, electric power loads have been growing at an average annual rate of about 7%, resulting in a doubling of loads about every ten years. (ERA citation 04:055116)

DOE/EIA-0010/2 PC **A02**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
EIA Annual Report on Monthly Comparisons of Peak Demands and Energy for Load: 1973 to 1977.
May 78, 23p

Monthly comparisons of peak demands and energy for load are presented. Data are tabulated and graphs prepared indicating monthly summaries of net energy for load and peak demand for each of the eight DOE statistical regions for the 1973 to 1977 period. (ERA citation 04:055111)

DOE/ERD-0017 PC **A03**/MF **A01**
Department of Energy, Washington, DC.
Environmental Readiness Document: Utility Transmission.
Aug 79, 37p

This Environmental Readiness Document was prepared to assist DOE in evaluating the commercial readiness of utility transmission technology with respect to environmental issues. An effort has been made to identify potential environmental problems that may be encountered based upon current knowledge, proposed and possible new environmental regulations, and the uncertainties inherent in planned environmental research. (ERA citation 04:054628)

DOE/ET/2880-1 PC **A11**/MF **A01**
Flow Resources Corp., San Rafael, CA.
Possible Future Environmental Issues for Fossil Fuel Technologies. Final Report.
L. D. Attaway. Jul 79, 245p
Contract ET-78-C-01-2880

The work reported here was carried out for the Department of Energy's Office of Fossil Energy to identify and assess 15 to 20 major environmental issues likely to affect the implementation of fossil energy technologies between 1985 and 2000. The energy technologies specifically addressed are: oil recovery and processing; gas recovery and processing; coal liquefaction; coal gasification (surface); in situ coal gasification; direct coal combustion; advanced power systems; magnetohydrodynamics; surface oil shale retorting; and true and modified in situ oil shale retorting. Environmental analysis of these technologies included, in addition to the main processing steps, the complete fuel cycle from resource extraction to end use. The 16 environmental issues identified as those most likely for future regulatory actions and the main features of, and the possible regulatory actions associated with, each are as follows: disposal of solid waste from coal conversion and combustion technologies; water consumption by coal and oil shale conversion technologies; siting of coal conversion facilities; the carbon dioxide greenhouse effect; emission of polycyclic organic matter (POM); impacts of outer continental shelf (OCS) oil development; emission of trace elements; groundwater contamination; liquefied natural gas (LNG), safety and environmental factors; underground coal mining - health and safety; fugitive emissions from coal gasification and liquefaction - health and safety; boomtown effects; emission of fine particulates from coal, oil and oil shale technologies; emission of radioactivity from the mining and conversion of coal; emission of nitrogn oxides; and land disturbance from surface mining. (ERA citation 04:051060)

EPRI-EA-1035-SR PC **A16**/MF **A01**
Electric Power Research Inst., Palo Alto, CA.
How Electric Utilities Forecast: EPRI Symposium Proceedings.
R. T. Crow. Mar 79, 364p CONF-771276-
EPRI symposium on how electric utilities forecast, New Orleans, LA, USA, 7 Dec 1977.

This symposium was organized to provide electric-utility forecasters an opportunity to learn from colleagues the current state of the forecaster's art. The emphasis of this symposium was on practice and application. Each person invited to give a paper was directly employed by an electric utility or was a consultant designated by a utility to represent that utility's forecasting methodology. Thus, all the papers presented discussed forecasting approaches currently in use by electric utilities. The symposium sought to include a wide range of forecasting philosophies. Of the 20 presentations made in six sessions, 17 papers were submitted for publication in the proceedings. Topics for the six sessions were: Forecasting Residential Kilowatthour Consumption, Forecasting Peak Demand and Load Shape, Forecasting Commercial Kilowatthour Consumption, Forecasting Problems of Small Utilities, Forecasting Industrial Kilowatthour Consumption, and Integrated Approaches to Forecasting. To introduce this volume, the symposium's coordinator discusses the background of electric utility forecasting. A separate abstract was prepared for the introductory paper and for each of the 17 presentations. (ERA citation 04:050223)

EPRI-EL-596 PC **A10**/MF **A01**
Arizona State Univ., Tempe. Dept. of Electrical Engineering.
Midterm Simulation of Electric Power Systems. Final Report.
D. P. Gelopulos. Jun 79, 211p

The results for all phases of project RP-745 are presented. The purpose of the research was to devise efficient algorithms for simulating power systems during post fault transients and for extended periods up to 4 min. beyond the usual transient period with both long term models and inter-unit oscillations represented. These algorithms have been fully verified by testing on a large scale computer program which was delivered to EPRI during the course of the research. This program is of production grade quality when used for transient simulations and has been thoroughly tested during extended simulation. Techniques which have been incorporated into the program include the following: simultaneous solution of the subsystem differential equations and network algebraic equations using Newton Raphson techniques and highly stable numerical integration techniques; use of different step size for models with different inherent speed of response; and a network reduction scheme which reduces the size of the network while retaining the primary effect of nonlinear loads. In addition, an experiment was conducted to investigate the effect of simplifying generator subsystem models during the extended period of simulation. The programs have been thoroughly documented in EPRI manuals numbered EL-597 through EL-603. (ERA citation 04:049863)

EPRI-FP-792(V.1) PC **A04**/MF **A01**
Southern Research Inst., Birmingham, AL.
Corona Electrode Failure Study. Final Report.
R. E. Bickelhaupt. Jun 78, 69p

The goals of this project were to acquire a better understanding and to assist in the solution of problems related to the failure of corona electrodes in electrostatic precipitators. From a relatively large data base it was determined that most corona electrode failures are due to: electrical erosion (65%); mechanical stress (15%); chemical corrosion (12%); and combinations thereof and unknown causes (8%). The conditions required to bring about failure usually can be related to excessive over-voltage, lack of or poor maintenance, manufacturing and installation problems, improper usage, and inadequate design. An attempt is made to present the data in a form usabie by plant operators to identify failure modes, to associate certain types of failure with probable locations, and to suggest remedial steps to eliminate certain types of failure. (ERA citation 04:026233)

EPRI-FP-840 PC **A04**/MF **A01**
Air Pollution Technology, Inc., San Diego, CA.
Submicron Particle Size Measurement with a Screen Diffusion Battery. Final Report.
R. G. Patterson, and S. Calvert. Aug 78, 73p

A review of particle collection on the wire mesh screens used in the A.P.T. Screen Diffusion Battery (SDB) is presented. Diffusion is the major collection mechanism for particles in the size range of 0.005 to 0.5 mu m. The study reports experiments performed on arrays of parallel wires. The results verify the theory of particle collection on single cylinders. The single wire diffusional collection efficiencies of 120, 250, and 325 mesh screens fit one design equation, but are somewhat greater than those predicted from theory. The theoretical effect of temperature and pressure on the diffusion collection mechanism is verified for the ranges of pa-

rameters tested. The effect of particle composition on the performance of the A.P.T. SDB is discussed for hygroscopic and non-hygroscopic aerosols. A mathematical model is presented for determining submicron particle size distributions from screen diffusion battery data. (ERA citation 04:026234)

EPRI-FP-889 PC **A03**/MF **A01**
Radian Corp., Austin, TX.
EPRI/Radian Particle Balance Concept Study. Final Report.
W. E. Corbett, O. W. Hargrove, Jr., and F. B. Meserole. Aug 78, 46p

This report describes the results of a program whose objective was to demonstrate the effectiveness of a patented process control concept for lime/limestone scrubbing systems. By exerting control over the mechanism of new particle generation in an operating scrubbing system the average size of the product sludge particles can be increased. The resulting impact of this change on the characteristics of the scrubber sludge generated by the Louisville Gas and Electric Paddy's Run No. 6 FGD system is described. (ERA citation 04:025259)

EPRI-FP-925 PC **A10**/MF **A01**
Battelle Columbus Labs., OH.
Control of NO/sub X/ Emission by Stack Gas Treatment. Final Report.
H. S. Rosenberg, L. M. Curran, A. V. Slack, J. Ando, and J. H. Oxley. Oct 78, 225p

This report is a state-of-the-art review of stack gas treatment methods for the control of NO/sub x/ emissions. More than 45 individual processes for removing NO/sub x/ from stack gas have been identified and are described in the body of the report. Particular emphasis is placed on factors affecting performance and status of development. Appendix A contains a classification of stack gas cleaning technology for NO/sub x/. Appendix B contains detailed data sheets for eight specific NO/sub x/ control processes in a cross section of categories but with the main emphasis centered on the most developed process. Appendix C contains a listing of the issued U.S. patents on NO/sub x/ control technology especially pertinent to utility boilers based on an extensive search of the patent art. Most of the active process development work is taking place in Japan. The patent protection issued in the United States to Japanese companies may dominate this technology in the future. The three leading stack gas treatment techniques for NO/sub x/ control are catalytic reduction with ammonia, noncatalytic reduction with ammonia, and direct scrubbing of NO with simultaneous absorption of SO sub 2 . The wet processes are much less developed than the dry processes. The transfer of Japanese technology on NO/sub x/ control to the United States should be viewed very carefully. The technology is still in a relatively early stage of development and a cost-benefit analysis has yet to be performed. Pilot-plant testing should be carried out to investigate the application-related problems for U.S. coals. (ERA citation 04:025260)

EPRI-NP-1089 PC **A13**/MF **A01**
California Univ., Los Angeles. School of Engineering and Applied Science.
GLASS II: Global--Local Finite Element Analysis of Structural Systems.
L. G. Bradford, S. B. Dong, A. Tessler, and R. A. Westmann. Jun 79, 283p

A computer program with acronym GLASS-II is described. This code is based on the concept of global--local finite elements, wherein both contemporary finite element and classical Rayleigh--Ritz approximations are simultaneously employed. The library of elements in GLASS-II include the axisymmetric element, planar element, three-dimensional solid element, plate bending element, and shell element. Moreover, for the axisymmetric and planar elements, general loading conditions can be treated by their expansion in terms of Fourier series. Derivation of the element matrices and consistent load vectors are described in detail. A brief description of the GLASS-II computer code is given, which at the present time is checked out for static analysis problems. A version with dynamic analysis capabilities is forthcoming. Instructions concerned with the programming of the global functions (a term used to denote the Rayleigh--Ritz approximations) are provided. These functions depend on the problem to be analyzed and must be provided by the user/analyst. The user's manual is contained in Appendix I and the computer listing of the GLASS-II code appears as Appendix II. This code has been applied to the calculation of stress intensity factors and to problems involving a half-space. These applications evince the modeling versatility and computational effectiveness inherent in global--local finite element analysis. 10 figures. (ERA citation 04:050815)

FE-1545-56 PC **A04**/MF **A01**
Combustion Engineering, Inc., Windsor, CT.
Evaluation of Design Parameters for Slagging Furnaces for Low-Btu Gasification of Coal for Electric Power Generation. Final Report R and D Task 3 (Phase 1).
R. W. Koucky. Jun 78, 69p
Contract EX-76-C-01-1545

A study of slagged ash disposal systems for entrained flow coal gasifiers was conducted. The study evaluated the physical and chemical properties of coal ash which are important in the design of slagged ash disposal systems, evaluated past and current experience with slagged ash removal systems and utilized applicable information in the design of the ash disposal system for Combustion Engineering, Inc's process development unit gasifier. (ERA citation 04:052450)

FE-2034-15 PC **A04**/MF **A01**
Montana State Univ., Bozeman.
Catalytic Hydrogenation of Coal-Derived Liquids. Interim Report, March 1979-May 1979.
L. Berg, and F. P. McCandless. Jun 79, 60p
Contract EX-76-C-01-2034

The concept of fabricating catalysts specifically designed to hydrodenitrogenate solvent-refined coal has been started. Using catalyst bases of specific surface area, pore volume and pore diameter and impregnating them with tungsten, nickel, cobalt and/or molybdenum has yielded denitrogenation of SRC from 1.17% nitrogen to 0.2% nitrogen, desulfurization from 0.73% sulfur to 0.2% sulfur, and this at 390 exp 0 C and only 1050 psig. The catalysts appear to be a cross between hydrotreating and hydrocracking catalysts and require a burn-off and resulfiding after about six hours of operation. They appear to offer the possibility of an economically attractive process for converting solvent refined coal into a feedstock for a conventional petroleum refinery. (ERA citation 04:052432)

FE-2455-27 PC **A06**/MF **A01**
Burns and Roe, Inc., Woodbury, NY.
Conceptual Design of an AFBC Electric Power Generating Plant. Final Report. Volume I. Executive Summary.
E. Kimel, S. Panico, J. Bianchini, M. Novack, and J. Armstrong. Feb 79, 118p
Contract ET-77-C-01-2455

Economic analyses were conducted to determine the mid-1978 generation costs and resulting cost of electricity (COE) for a base case AFBC plant, incorporating all the applicable and economically justifiable improvements resulting from the design study programs, and a comparable, base case, pulverized coal-fired (PCF) plant utilizing a FGD system. In addition, economic sensitivity analyses were conducted in order to determine the COE for AFBC and PCF plant configurations corresponding to a plant extension and a boiler conversion of an existing oil-fired plant. Additional economic sensitivity analyses considered the effect of varying the SO sub 2 emission level on base case AFBC and PCF plant economics and the effect of varying the superficial fluidizing velocity on AFBC base case plant economics. All AFBC plant economic analyses are based on CE's modified design, which is presented in Appendix A of Volume III of this report. This modified design includes an improved main bed cyclone, with a particulate collection efficiency of 95% and a corresponding carbon collection efficiency of 99% (an increase from the 90% particulate and 90% carbon collection efficiencies selected in the previous design), and confirmation of the optimum high temperature steam in bed tube configuration, the 12 ft/sec superficial fluidizing velocity, and the uniformity of the feed splitter flow distribution. (ERA citation 04:053129)

FE-2635-T1 PC **A21**/MF **A01**
Water Purification Associates, Cambridge, MA.
Conceptual Designs for Water Treatment in Demonstration Plants. I. Plant Designs.
F. B. Seufert, R. E. Hicks, I. W. Wei, and D. J. Goldstein. Mar 79, 487p
Contract EF-77-C-01-2635

We have concluded that: (1) It is worhtwhile considering procedures for production of boiler feed water which, while well established, are not always considered. We recommend consideration of counter-current regenerated ion exchange, particularly when a concentrated waste stream is preferred to a higher volume dilute waste; we recommend also consideration of reverse osmosis, particularly when a dilute waste stream with minimum total salt content is preferred. (2) Designing treatments for wastewater is limited by lack of information. Some needs are listed under recommendations. (3) The cost of treating highly concentrated, organically contaminated wastewater can be significantly reduced by using two different treatments in sequence rather than relying on one treatment only. (4) It has proved to design for a high degree of water reuse with minimum water discharge. This entailed high concentrations in circulating cooling waters which, while most probably attainable, should be demonstrated to be practical. (5) The approximate cost for water management is in the range of 10 cents/10 exp 6 Btu for Hygas demonstration plants (east and west); 5 cents/10 exp 6 Btu for commercial Lurgi plant; 1.1 cents/10 exp 6 Btu for the SRC plant which has very small water streams; 15 cents/10 exp 6 Btu for the Bigas plant using sewage (one third of the cost is to fit treated sewage for boiler feed); 19 cents/10 exp 6 Btu for the Synthane plant with brackish water intake (the reverse osmosis units are expensive). (ERA citation 04:050983)

FE-2893-25 PC **A11**/MF **A01**
Exxon Research and Engineering Co., Florham Park, NJ.
EDS Coal Liquefaction Process Development. Phase IV. Quarterly Technical Progress Report, October 1-December 31, 1978.
W. R. Epperly. Mar 79, 240p
Contract EF-77-A-01-2893

A liquefaction bottoms recycle study was conducted in the 50 pound-per-day Recycle Coal Liquefaction Unit (RCLU-1). The purpose of this study was to evaluate the effect of bottoms recycle on Exxon Donor Solvent (EDS) liquefaction yields for Illinois No. 6 coal from the Monterey No. 1 mine. Solvent hydrogenation catalyst activity studies to confirm earlier observed effects attributed to feed heteroatom (sulfur, nitrogen, and oxygen) content were completed. These effects, with both Illinois No. 6 and Wyoming coal solvents over Ni/Mo-10 catalyst, were due to high initial catalyst activities and not to the lower Wyoming solvent heteroatom content. Over the ranges tested, the effects of the heteroatoms on the activity of both Ni/Mo-10 and Co/Mo-20 catalysts were negligible. Combustion tests were completed with raw Wyoming (Wyodak) solvent in a home heating oil burner, and with 350/1000 exp 0 F and 350 exp 0 F exp + fractions, including coker liquids in a 50 hp Cleaver-Brooks industrial boiler. The accuracy of the Generalized Riedel in predicting the vapor pressures of Wyoming coal liquids was examined. As previously found with Illinois coal liquids, this procedure is superior to the Maxwell-Bonnel method in predicting vapor pressures at temperatures above the normal boiling point. (ERA citation 04:052481)

FE-3199-1 PC **A02**/MF **A01**
Florida State Univ., Tallahassee.
Electron Beam Ionization for Coal Fly Ash Precipitators. Quarterly Report, July 14--October 13, 1978.
R. H. Davis. Oct 78, 7p
Contract ET-78-S-01-3199

Planning for the construction and test of a laboratory precipitator system for operation with coal fly ash, has begun. Contacts have been made for the procurement of fly ash samples with various resistivities, including a sample of high resistivity fly ash. A crucial part of the system is the prompt monitoring of the resuspended fly ash, both before and after the test unit. At present, Knollenberg monitors continue to be the best choice but further dis-

cussions with knowledgeable users at EPA and at Southern Research Institute will be carried out prior to a commitment. The nub of the monitor problem lies first in the need for a prompt response and second in the small scale of the laboratory system which requires a particle monitor for sufficient sensitivity. (ERA citation 04:025262)

IVL-B-449 PC **A03**/MF **A01**
Swedish Water and Air Pollution Research Lab., Goteborg.
Role of Ammonia in the Chemistry of Atmospheric Aerosols.
C. Brosset. Jun 78, 34p
U.S. Sales Only.

In the years 1974--1976, investigations were carried out in different places in Sweden to determine the concentration of H exp + and NH exp +4 in the water-soluble part of airborne fine particles. It was found that the concentration quotient H exp + /NH exp +4 varies in a rather systematic manner. This variation indicates that particles present in the air over an agricultural area take up ammonia. On the other hand, they seem to release this component when present over a forest district with acid lakes. Under equilibrium conditions, the quotient H exp + /NH exp +4 is dependent more or less directly on the atmospheric partial pressure of ammonia. However, in particle samples this quotient will not be solely dependent on the equilibrium position but also on the time factor. Other parameters likely to influence the concentration quotient H exp + /NH exp +4 are the flow of ammonia from or to the ground, and transport conditions. (ERA citation 04:039543)

IVL-B-479 PC **A03**/MF **A01**
Swedish Water and Air Pollution Research Lab., Stockholm.
Station for Measurements on the Air at Onsala, Sweden 1968–1978: Aims and Reached Results.
C. Brosset. Dec 78, 36p
In Swedish.
U.S. Sales Only.

The station for measurements on the air is situated 40 km to the south of Gothenburg. It has been operative since 1968. The aim of the activity has been to determine the background proportions of different air pollutants and their variations with time within an area characteristic for the Swedish west coast. Furthermore the origins of the different pollutants have been studied as well as the production and the transport of them and material useful for the determination of the ecological effects of different industrial emissions has been collected. (ERA citation 04:050564)

LBL-9323 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Instrumentation for Environmental Monitoring.
R. D. McLaughlin, M. S. Hunt, D. L. Murphy, and C. R. Chen. Jun 79, 14p CONF-790673-2
Contract W-7405-ENG-48
13. annual conference on trace substances in environmental health, Columbia, MO, USA, 4 Jun 1979.

In the last few years a much greater emphasis has been placed upon understanding, controlling and monitoring the environmental effects of the advancing technologies. This has resulted in rapid advances in techniques for environmental monitoring. To aid the concerned scientist in keeping abreast of these developments, the Lawrence Berkeley Laboratory publishes a collection of volumes entitled Instrumentation for Environmental Monitoring. Separated into four volumes covering four media, Air, Water, Radiation, and Biomedical, they provide a source book for three types of material: (1) Monitoring Rationale. They describe the characteristics, forms, and effects of a wide variety of pollutants and the means of controlling them. Federal regulations are explained and summarized. (2) Analytical Techniques. Methods of determining specific pollutants are described with special emphasis on the principles that form the basis of instrumental methods. (3) Commercial Instrumentation. The features of most commercially available instrumentation used for the determination and monitoring of each pollutant are presented in a manner that facilitates instrumental comparisons. Examples of the types of material in the volumes and the use of the volumes are presented. (ERA citation 04:052108)

METC-8085-T1 PC **A07**/MF **A01**
TRW, Inc., McLean, VA. Energy Systems Planning Div.
Department of Energy/Morgantown Energy Technology Center 42-Inch Diameter Producer Stream Gas Clean-Up System Mathematical Model.
Mar 79, 134p
Contract EY-77-C-21-8085

This report presents the mathematical models and computational procedure for the material balance calculation around each of the following units that constitute the METC producer gas clean-up system: gas cyclone; humidifier; electrostatic precipitator; hydrolysis unit; direct cooler; Stretford process; and final wash tower. The computation procedure is specifically designed to calculate the material balance for the producer gas clean-up system. All items to be computed by the program are listed. The process is sequential, in that the outlet stream from a unit is directly fed into the unit immediately following it. This procedure simplifies the computation because no iteration procedure is required. Two different kinds of data input are needed in each process unit calculation: preassigned data, such as temperature and pressure etc., and feed composition and flow rate. The gasifier simulation program developed earlier is integrated with this gas clean-up system simulation program through a hypothetical joint box. The present clean-up system modelling is handicapped by a lack of some crucial information, among them being: vapor--liquid equilibrium and enthalpy data for tar; proprietary process equipment performance information; and reaction kinetics information. Wherever such information is lacking, appropriate assumptions are made to circumvent the difficulty. These assumptions, however, should be verified by comparing computed values from this program with experimentally obtained data from the pilot plant. (ERA citation 04:050989)

NUREG/CR-1106 PC **A12**/MF **A01**
Tetra Tech, Inc., Pasadena, CA.
Tsunami Atlas for the Coasts of the United States.
Technical rept.,
M. Brandsma, D. Divoky, and L. Hwang. Nov 79, 255p TETRAT-TC-486

This report presents the results of a study to determine the distribution of offshore wave heights and time histories for coastal segments of the United States due to distantly generated tsunamis. A large hypothetical earthquake is defined by appeal to history and tectonic theory. This canonical source serves as input to a numerical hydrodynamic model which computes the resulting wave history anywhere within the ocean basin. This procedure is repeated for a number of potential source locations, chosen according to degree and type of seismic activity. In this way, hypothetical coastal histories of great tsunamis emanating from any potential source area are simulated.

N80-10685/9 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
The 1977 Emissions Inventory for Southeastern Virginia.
D. A. Brewer, E. E. Remsberg, G. E. Woodbury, and L. C. Quinn. Sep 79, 30p NASA-TM-80119

Regional tropospheric air pollution modeling and data compilation to simulate the time variation of species concentrations in and around an urban area is discussed. The methods used to compile an emissions inventory are outlined. Emissions factors for vehicular travel in the urban area are presented along with an analysis of the emission gases. Emission sources other than vehicular including industrial wastes, residential solid waste disposal, aircraft emissions, and emissions from the railroads are investigated.

N80-10686/7 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Washington, D. C.
Analysis of Method of Polarization Surveying of Water Surface Oil Pollution.
B. S. Zhukov. Sep 79, 26p NASA-TM-75708, PR-443
Contract NASW-3198
Tran-Transl. Into English of "Analiz Metoda Polyarizatsionnoy Siyemki Neftyanykh Zagryazneniy Vodnoz Poverkhosti", Rept. Pr-443 Acad. Of Sci. Ussr, Inst. Of Space Res., Moscow, 1979 p 1-30. Subm-Transl. By Scientific Translation Services, Santa Barbara, Calif.

A method of polarization surveying of oil films on the water surface is analyzed. Model calculations of contrasted oil and water obtained with different orientations of the analyzer are discussed. The model depends on the spectral range, water transparency and oil film, and the selection of observational direction.

PATENT-4 081 513 Not available NTIS
Environmental Protection Agency, Washington, DC.
Disposal of Sulfur Oxide Pollutant-Containing Gas.
Patent,
Gerald Moss. Filed 9 Dec 75, patented 28 Mar 78, 7p PB80-114911, PAT-APPL-639 132
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A pollutant such as SO2 is removed from a pollutant-containing gas stream by passing the stream to a drying zone to which a solution and/or dispersion of pollutant-reactive material (such as CaO) is supplied, the drying zone operating to evaporate the liquid (e.g.water) and at least some pollutant reacting with the material to form an innocuous disposable solid which is removed, the pollutant-depleted gas stream being scrubbed in a scrubbing zone by a solution and/or dispersion of pollutant-reactive material to form substantially pollutant-free gas which is vented to atmosphere, the solution and/or dispersion being recovered from the scrubbing zone, some being recirculated back to the scrubbing zone after the addition of required make-up liquid and/or pollutant-reactive material, and some being passed to the drying zone preferably after concentrating the pollutant-reactive material therein. Preferably, the drying zone is a bed of solids fluidized by the incoming hot pollutant-containing gas stream.

PB80-101074 PC **A05**/MF **A01**
Pinnell-Anderson-Wilshire and Associates, Inc., Dallas, TX.
Inductive Loop Detectors: Theory and Practice.
Final rept.,
C. Pinnell. Jan 76, 93p FHWA/RD/IMP-76/2
Contract DOT-FH-11-8123

This implementation Package provides a users manual for design application and performance testing of inductive loop detector systems developed by the Department of Traffic, City of Los Angeles, California. It is based on a study of many of their approximately 3,000 loop detector field installations. The purpose of the study was to determine the causes of failure or intermittent operations and to develop aids for the design, test, and maintenance of these systems. Basic theory of loop detector operation is also presented along with a discussion of loop size and shape. Installation procedures used in the Urban Traffic Control System (UTCS) in Washington, DC, are presented with other discussions of practical ways to deal with the installation of loops across pavement joints. A detector trouble-shooting procedure, with detail instructions and data recording forms, is presented in an Appendix in a form suitable for removal and use by individual technicians.

PB80-102387 PC **A11**/MF **A01**
Cameron Engineers, Inc., Denver, CO.
Nonwater Quality Impacts of Closed-Cycle Cooling Systems and the Interaction of Stack Gas and Cooling Tower Plumes.
Final rept. Oct 77-Jan 78,
G. A. Englesson, and M. C. Hu. Mar 79, 231p EPA/600/7-79/090
Contract EPA-68-01-4337

The report gives results of a literature survey of the nonwater quality impacts of closed-cycle cooling systems. Following discussions of cooling tower and stack gas plumes, interactions of these

plumes are considered. For cooling tower plumes, plume types, behavior, salt drift generation and deposition, and inadvertent weather modifications are reviewed. Meteorological conditions enhancing deposition, icing and fogging, and cloud formation are emphasized. The discussion of cooling-tower/stack-gas plume interactions focuses on interactions, acid precipitation, case studies of operating power plants, and control practices to reduce or minimize these interactions. Adverse biological impacts of acid precipitation, cooling tower drift, and icing and fogging on biota are treated. Effects of acid precipitation on soil, soil biota, vegetation, and aquatic biota (including planktonic and benthic organisms and fish) are considered relative to levels causing harm or injury. This examination includes: atmospheric and cooling tower salt loading, cumulative effects of both, and salt tolerances of animals and plants. Emphasis is on threshold concentrations at which biota is affected by drift deposition and the distance from the cooling tower where toxic levels result.

PB80-102890 PC **A04**/MF **A01**
Ohio Agricultural Research Development Center, Wooster.
Research Needs Assessment - Livestock Manure Management in the United States.
Final rept. 22 May 78-30 Apr 79,
R. K. White. Aug 79, 62p EPA/600/2-79/179
Grant EPA-R-806025

The purpose of this report is to identify and assess research needs for livestock manure management as related to environmental quality. Needs identified are prioritized and assigned to one or more function areas, such as, environmental quality, demonstration, livestock production, education, and energy.

PB80-103542 PC **A03**/MF **A01**
Bend Research, Inc., OR.
Coupled Transport Systems for Control of Heavy Metal Pollutants,
W. C. Babcock, R. W. Baker, D. J. Kelly, J. C. Kleiber, and H. K. Lonsdale. Aug 79, 44p EPA/600/2-79/181
Grant EPA-R-804682-01

This report describes a process for separating and concentrating heavy metals from electroplating rinse waters. Metal ions can be 'chemically pumped' across a coupled transport membrane against large concentration gradients by allowing the counterflow of a coupled ion such as hydrogen ion. The process is carried out within a microporous membrane containing within its pores an organic, water immiscible complexing agent. The complexing agent acts as a shuttle, picking up metal ions on one side of the membrane, carrying them across the membrane as a complex, and preserving electrical neutrality by carrying hydrogen ions in the opposite direction. The importance of coupled transport is its high selectivity and flux. High selectivity derives from the rise of specific complexing agents. High flux is possible because these are actually liquid membranes with diffusivities many times greater than those in solid membranes.

PB80-103591 PC **A02**/MF **A01**
Environmental Research Lab., Athens, GA.
Determination of Octanol/Water Distribution Coefficients, Water Solubilities, and Sediment/Water Partition Coefficients for Hydrophobic Organic Pollutants,
Samuel W. Karickhoff, and David S. Brown. Apr 79, 25p EPA/600/4-79/032

Octanol/water distribution coefficients, water solubilities, and sediment/water partition coefficients are basic to any assessment of transport or dispersion of organic pollutants. In addition, these determinations are prerequisites for many chemical or biological process studies. In response to the accepted need for this type of data and in light of the widespread discrepancies in reported data, this report sets forth conventional methods of measurement and identifies potential sources of measurement error for these three physical properties.

PB80-103617 PC **A03**/MF **A01**
Environmental Sciences Research Lab., Research Triangle Park, NC.
Relationships between Total Suspended Particulate, Sulfate, and Respirable Suspended Particulate Concentrations. Analysis of Data Collected in New York City.
Rept. for Jul 78-Jun 79,
Gerard A. DeMarrais. Sep 79, 33p EPA/600/4-79/046

Two years of data for daily total suspended particulate, sulfate, and respirable suspended particulate concentrations measured at four stations in the New York City area are statistically analyzed. To show the variability of each pollutant data set, the mean, median, and 16th and 84th percentile values of concentration of each pollutant are summarized. To demonstrate the spatial representativeness of the concentrations of individual pollutants, the daily (24-hour) concentrations at pairs of stations were compared and correlation coefficients determined. Results indicated that sulfate concentrations varied on an area-wide basis while the concentration of respirable suspended particulates at the four stations appeared to depend on local conditions.

PB80-104060 PC **A05**/MF **A01**
Colorado State Univ., Fort Collins. Cooperative Extension Service.
Colorado Cooperative Extension Service-National Science Foundation Environmental Technology Transfer Program Development Project,
L. H. Watts, M. Felton, and T. Davis. Mar 74, 85p NSF/RA/R-74/082
Grant NSF-GT-39555

A project designed to develop a specific methodology for applying the Colorado Extension Service education and information model to local environments' concerns and needs is reported. An environmental concerns questionnaire was prepared and distributed throughout the state. Major concerns of respondents were water availability, supply, quality, and pollution; land and water use planning and regulation; social and economic factors; and scenic beauty. Concern also was expressed about wind, hail, gasoline, litter, junk cars, gasoline predators, and housing. Recommendations were made for applying technology transfer to these identified needs.

PB80-105562 PC **A05**/MF **A01**
Little (Arthur D.), Inc., Cambridge, MA.
Environmental Considerations of Selected Energy-Conserving Manufacturing Process Options. Volume XX: Toxics/Organics.
Final rept.
Aug 79, 99p EPA/600/7-79/162
Contract EPA-68-03-2198
See also Volume 1, PB-262 977.

Arthur D. Little, Inc. undertook a study of the 'Environmental Considerations of Selected Energy-Conserving Manufacturing Process Options.' Some 80 industrial process options were examined in13 industrial sectors. Results were published in 15 volumes, including a summary, industry prioritization report, and 13 industry oriented reports. The present report summarizes the information regarding toxic/organic pollutants in the 13 industry reports. Specifically, the report relates to the following: Processes and potential toxic/organic discharges--(Bases of calculations, iron and steel, petroleum refining, pulp and paper, olefins, ammonia, alumina/aluminum, textile, cement, glass, chlor-alkali, phosphorus/phosphoric acid, primary copper, and fertilizer).

PB80-105695 PC **A02**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Public Transport and the Planning of Residential Areas,
F. V. Webster, and P. H. Bly. c1979, 22p TRRL-SUPPLEMENTARY-510
Also pub. as ISSN-0305-1315.

The report considers the way in which the various components of the 'generalized cost' of making a public transport journey, i.e. the walk time, the waiting time, the riding time and the fare, may be traded off against each other in order to provide a service which minimizes the total 'costs' of traveling. For example, for a given number of buses, waiting time can be reduced at the expense of longer walks by concentrating buses onto fewer routes; walking can be reduced at the expense of longer rides by more devious routing and by having more frequent stops and both waiting and walking can be reduced at the expense of higher fares. The report reviews modelling approaches which have been used to examine these tradeoff situations. The amount of public transport use depends on the characteristics of the area which it serves as well as on the particular qualities of the service provided and a modelling approach is described which looks at the likely effects on bus use of changes in population and residential density. (Copyright (c) Crown Copyright 1979.)

PB80-105828 PC **A12**/MF **A01**
Tennessee Valley Authority, Muscle Shoals, AL. Emission Control Development Projects.
Definitive SOx Control Process Evaluations: Limestone, Double Alkali, and Citrate FGD Processes.
Rept. on Phase 1, Jan 78-Mar 79,
S. V. Tomlinson, F. M. Kennedy, F. A. Sudhoff, and R. L. Torstrick. Aug 79, 263p ECDP/B-4, EPA/600/7-79/177

The report gives results of a detailed comparative technical and economic evaluation of limestone slurry, generic double alkali, and citrate flue gas desulfurization (FGD) processes, assuming proven technology and using representative power plant, process design, and economic premises. For each process, economic projections were made for a base case (500 MW, 3.5% sulfur coal, new unit) and case variations in power unit size, fuel type, sulfur in fuel, new and existing power units, waste slurry ponding and filter cake trucking, and SO2 removal (1.2 lb SO2 allowable emission per million Btu heat input vs 90%). Depending on unit size and status, fuel type and sulfur content, solids disposal method, and overall project scope, ranges in estimated capital costs in 1979 dollars are $71 to $127/kW for limestone slurry, $80 to $130/kW for generic double alkali, and $105 to $194/kW for citrate (recovery process). Results can be scaled or altered to reflect other site-specific conditions. Capital investment, annual revenue requirements (7000 hr/yr), and lifetime revenue requirements over a 30-year declining operating profile were estimated for the base case and each variation. Investment costs were projected to mid-1979; annual revenue requirements were calculated in projected mid-1980 dollars. Effects of variations in various cost parameters were studied.

PB80-106040 PC **A05**/MF **A01**
Little (Arthur D.), Inc., Cambridge, MA.
Environmental Considerations of Selected Energy-Conserving Manufacturing Process Options. Volume XVII. Nitrogen Oxides Summary Report.
Final rept.
Jul 79, 90p EPA/600/7-79/142
Contract EPA-68-03-2198
See also Volume 1, PB-262 977.

Arthur D. Little, Inc. undertook a study of the 'Environmental Consideration of Selected Energy-Conserving Manufacturing Process Options.' Some 80 industrial process options were examined in 13 industrial sectors. Results were published in 15 volumes, including a summary, industry prioritization report, and 13 industry oriented reports. The present report summarizes the information regarding nitrogen oxide pollutants in the 13 industry reports. Topics considered include the following: Processes and potential nitrogen oxide emissions--(Bases of calculations, NOx control methods, petroleum refining industry, cement industry, olefins industry, alumina and aluminum industry, glass industry, copper industry, fertilizer industry, ammonia, iron and steel, phosphorus/phosphoric acid, textile industry, pulp and paper industry, and chlor-alkali industry).

PB80-106081 PC **A08**/MF **A01**
Versar, Inc., Springfield, VA.
Assessment of Solid Waste Management Problems and Practices in the Inorganic Chemicals Industry.
Oct 79, 164p EPA/530/SW-180C
Contract EPA-68-03-2604

This report examines the solid wastes generated by the inorganic chemicals industry relative to the

impact of Section 4004 of the Resource Conservation and Recovery Act. The report provides (1) a data base on the type and quantity and disposal techniques now applied for the control of inorganic chemicals; (2) the background information needed to develop a long-term strategy for Federal policies concerning solid wastes from the inorganic chemicals industry; (3) information concerning the costs to industry of meeting RCRA requirements, specifically Section 4004.

PB80-106164 PC **A02**/MF **A01**
Public Technology, Inc., Washington, DC.
Priority R and D Needs of Urban America, Resource Document.
1979, 22p NSF/RA-790191
Grant NSF-ISP76-11055

Priority statements for 1977 and 1978 of ten Task Forces of the Urban Consortium for Technology Initiatives are reported. The Consortium is a national cooperative of 36 cities and urban counties established to identify research and development needs of urban governments and to channel resources into the most critical areas. By identifying and establishing priorities for urban needs the Consortium provides local governments with a structured means of working together with the nation's R & D resources. Networking of local governments also provides a collective purchasing power. Priority needs were identified by each of the following Task Forces: Community and Economic Development; Criminal Justice; Energy Environmental Services; Fire Safety and Preparedness; Health; Human Resources; Management (finance and personnel); Public Works and Public Utilities; and Transportation. A precis of each listed need is included.

PB80-106438 PC **A04**/MF **A01**
Municipal Environmental Research Lab., Cincinnati, OH. Wastewater Research Div.
Biodegradation and Treatability of Specific Pollutants.
Final rept.,
Edwin F. Barth, and Robert L. Bunch. Oct 79, 69p EPA/600/9-79/034

This report discusses fundamental and technical considerations relating to laboratory studies of the fate and effects of organics and metals in biological wastewater treatment processes. The relationships between analytical control tests and biodegradation test methods are discussed. Various laboratory apparatuses for both continuous flow and static biodegradation methods are described. Both aerobic and anaerobic test results are included in the report.

PB80-106586 PC **A05**/MF **A01**
Oregon Dept. of Transportation, Salem. Traffic Engineering Section.
Variable Message Fog Hazard Warning Signs to Control Vehicle Operating Characteristics.
Final rept. Nov 68-Jun 79,
L. E. George, D. K. Hofstetter, and D. R. Wagner. Jun 79, 84p 79/3, FHWA/OR-79/3
See also report dated Apr 72, PB-210 205.

The objective of the research project was to determine the effectiveness of a variable message fog warning sign system on a 6.5 mile fog prone section of Interstate 5 in Oregon. Prior to installing this variable message sign system in 1968, an intensive literature search was conducted to determine the optimum signing system for our needs. It was determined that prior experience with this type of system had not been adequately documented. Therefore, the 'Oregon Design' was developed, and this study conducted to determine the system's effectiveness. The primary finding of this study was that the 'Oregon Design' variable message fog warning sign system has been effective in reducing the number of fog related accidents on this section of highway.

PB80-106651 PC **A08**/MF **A01**
Southern Methodist Univ., Dallas. TX. Dept. of Industrial Engineering and Operations Research.
Solution of Large Scale Pipe Networks by Improved Mathematical Approaches,
Michael A. Collins, Leon Cooper, Richard V. Helgason, and Jeff L. Kennington. Aug 78, 172p IEOR-77016-WR77001, W80-00869, OWRT-C-7115(6223)(2)
Contract DI-14-34-0001-6223

Approximate solutions to the classical pipe network analysis problem are traditionally obtained by direct solution of the nonlinear network equations arising from mass conservation and pressure continuity conditions. Iterative methods are commonly used to solve these network equations. It is shown that these conditions are stationary point conditions. As a consequence, a revolutionary approach involving optimization techniques for solving this important engineering problem is proposed and evaluated. Kuhn-Tucker theory is used to show that there exists two mathematical programming models, a Content Model and a Co-Content Model, whose solution is precisely the solution to the pipe network analysis problem. The Content Model has a special structure well suited to nonlinear optimization techniques. Three optimization algorithms are coded and used to solve four pipe network analysis problems. A state of the art Newton-Raphson code is also used to provide a comparison of the computational behavior between these three optimization techniques and traditional solution methods.

PB80-106743 PC **A07**/MF **A01**
Massachusetts Univ., Amherst. Water Resources Research Center.
Urbanization and Water Quality Planning: The 208 Experience in Massachusetts.
Completion rept.,
Harry E. Schwarz, Brandon B. Johnson, Robert J. Caiazzo, and Debra E. Pincus. Jan 79, 146p PUB-104, W80-00870, OWRT-A-104-MASS(1)
Contract DI-14-34-0001-8023
Prepared in cooperation with Clark Univ., Worcester, MA. Environmental Affairs Program.

The initial premise of this study was that the degree of urbanization in an area would affect the scope of the planning process, public participation in planning, and the plan itself. Three measures of urbanization were used in this study: the percentage of the region in urban land use; the proportion of the population served by sewers; and the population density. Each of these was an independent variable in assessing the inter-regional variation of attributes of the 208 plans and of the 208 planning process. It was found that the degree of urbanization does not appear to have been a significant factor in the 208 planning process.

PB80-107055 PC **A08**/MF **A01**
Atlantic Research Corp., Alexandria, VA.
Evaluation of Methodology and Prototype to Measure Atmospheric Sulfuric Acid.
Final rept. Sep 76-Nov 78,
R. E. Snyder, M. E. Tonkin, and A. M. McKissick. Aug 79, 172p EPA/600/2-79/168
Contract EPA-68-02-2467
See also report dated Jan 77, PB-265 395.

A method was developed to selectively assay ambient sulfuric acid aerosol. The method uses the vapor of a volatile amine (or amine derivative) to neutralize the acid as it is collected on a Teflon filter. The amine sulfate thus formed is thermally decomposed at 200 degrees C to release sulfur dioxide, or other stoichiometrically related sulfur containing adducts, which are measured by a flame photometric detector. Immediate chemical fixation of the acid lessens the chance of side reactions with other substances on the filter, while the relatively low decomposition temperature aids in eliminating other sulfur-containing particles. Sulfur dioxide is also collected as a reagent complex on the filter, but is selectively removed by heating at 100 degrees C.

PB80-107162 PC **A04**/MF **A01**
California State Dept. of Transportation, Sacramento. Office of Transportation Lab.
Validation of the CALINE 2 Model Using Other Data Bases (Type B Study).
Final rept. Dec 77-Jan 79,
Paul E. Benson, and Bennett T. Squires. May 79, 70p TL-657302, FHWA/CA-79-09

New Gaussian vertical dispersion curves for the first 100 meters downwind of a freeway are proposed. The validity of assuming a vertical Gaussian distribution of pollutants near the freeway is examined. Results are given which indicate that traffic induced turbulence dominates at the point of emission, but that daytime variations in traffic flow have a negligible effect on the initial mixing of the pollutant at the source. Residence time within the 'mixing cell', as determined by ambient wind speed, controls the initial amount of mixing that occurs.

PB80-108160 PC **A11**/MF **A01**
Research Triangle Inst., Research Triangle Park, NC.
Interpretation of Environmental Assessment Data.
Final rept. Mar 78-Sep 79,
N. H. Sexton, F. W. Sexton, L. I. Southerland, and T. D. Hartwell. Sep 79, 242p EPA/600/7-79/226
Contract EPA-68-02-2156

The report describes preliminary attempts to formulate viable models for interpreting environmental assessment data. The models are evaluated using data from the four most comprehensive environmental assessments. A format for entering environmental assessment results on FORTRAN computer sheets is presented and more complete data entry sheets, being developed by IERL-RTP are discussed. Various previously proposed models (Source Severity; Source Assessment Models SAM/I, SAM/IA, and SAM/IB) are investigated using the data from the four previously mentioned studies. Correlations between biotests and chemical results, and between biotests, were calculated using the data from these four studies; a summary of possible correlations is presented. In the study of correlations, the data are examined from each study individually and from the entire data set taken as a whole. Generally, results do not reveal a strong degree of association between the chemical analyses and the biological tests. When all factors relevant to an intelligent decision on the acceptability of a waste stream are considered, there appears to be no mathematical model that will encompass all of them. The models are useful but must still be utilized with considerable care.

PB80-109457 PC **A11**/MF **A01**
Henningson, Durham and Richardson, Inc., Minneapolis, MN.
Solid Waste Energy and Resource Recovery Study for Hennepin County, Minnesota.
Final rept.,
Dec 75, 237p HUD-0000293
Contract HUD-H-2141R

A 12 - month study was conducted in Hennepin County, Minn., and adjacent counties to confirm and refine the technical and economic feasibility of energy and resource recovery from solid waste. Sponsored by the Minnesota Pollution Control Agency and HUD's Office of Policy Development and Research, the study aims at identifying and evaluating specific potential markets for waste and determining effective facilities systems for solid waste movement, management, processing, materials recovery, and energy recovery. Residential, commercial, and industrial waste generation rates were established on a per capita and per employee basis and processable waste generation in tons per week was determined. The composition of the waste was then evaluated for recoverable materials and energy recovery. Strong, reliable markets were identified for ferrous and aluminum metals, but because of uncontrollable influences on markets and supply, recovery of glass, paper, and cardboard is questionable. Potential fuel markets were evaluated for supplemental fuel, steam, pyrolysis gas, and pyrolysis oil. The recommended alternative is a central steam plant near the Minneapolis central business district, since the estimated cost saving for this project would be $6 million in 1980 and $8 million in 1990. The study also revealed that hospital and health care wastes could be accommodated at a resource recovery facility; automated solid waste collection is less economical than conventional truck collection, and no significant adverse environmental effects would result from implementation of the study recommendations. Alternative organizational structures are identified for implementing the proposed program and evaluated relative to existing legislative and regulatory features and functional organization criteria. Tabular data, charts, and maps of the study area are provided. (Author abstract modified).

PB80-109465 PC **A07**/MF **A01**
Henningson, Durham and Richardson, Inc., Minneapolis, MN.
Solid Waste Energy and Resource. Recovery Study for Hennepin County, Minnesota. Appendix C: Model Contract Documents.
Dec 75, 135p HUD-0000294
Contract HUD-H-2141R

Model contract documents are presented pertaining to a project for solid waste and energy resources recovery for Hennepin County, Minn., and surrounding counties. The project rationale and description were developed during a 12 - month study to identify and evaluate specific potential markets for energy and solid waste components and determine effective facilities and systems for solid waste movement, management, processing, materials recovery, and energy recovery. The model contracts presented in this appendix include a solid waste supply contract, model specifications for disposal of ash residue, model specifications for purchase of coal for standby fuel purposes, and agreements for the sale of energy to firm customers, sale of energy to interruptible customers, sale of recovered components, use of existing steam distribution facilities, and use of existing steam plants. The contracts outline conditions regarding delivery and receipt of solid waste, delivery quantities, disposal fees, title to solid waste, recordkeeping, access to information, payment of employees, insurance, and the right to cure defaults. The specifications include provisions on the disposer's operation, capacity, and equipment, delivery and character of wastes, rates, disposal, transportation liability, failure of contractors, methods of awarding contracts, interruptions of service, and termination. Exhibits on sale agreements costs for amount of waste, conditions of service, and interruption of services are provided.

PB80-109499 PC **A15**/MF **A01**
Virginia Univ., Charlottesville. Div. of Urban and Environmental Planning.
Equity and Urban Service Distribution. Modules 1-5.
William H. Lucy, and Kenneth R. Mladenka.
1977, 332p HUD-0000314

Equity and urban services distribution are emphasized in this collection of five modules, including a general module and specific modules discussing solid waste collection, library, park, and police services. The general module introduces urban managers to the concepts of equity and service distribution useful for local planning and standard operating procedures or decision rules used by municipal governments to plan services. It proposes a methodology for analyzing urban service distribution inside a framework where each service has objectives, resources, activities, results, and impacts. Legal issues involving service distribution are addressed (discrimination, need for services, and interjurisdictional inequities). A management strategy is then developed for service distribution processes. The handbooks dealing with specific services provide frameworks for considering the equity of these services geographically and by unit and for determining equity based on need, willingness to pay, demand, and preference. Service indicators are presented for each type of service discussed, and data gathering procedures are considered. Each handbook contains policy questions for helping managers formulate service goals and decisionmaking sequences. Tables of sample service indicators, sample citizen surveys for assessing service status, and references are provided.

PB80-109523 MF **A01**
Brookings Institution, Washington, DC.
Decentralizing Community Development.
Paul R. Dommel, Richard P. Nathan, Sarah F. Liebschutz, and Margaret T. Wrightson. 2 Jun 78, 418p HUD-0000352, HUD/PDR-354
Paper copy available from the Sup. of Docs., Stock number 023-000-00483-6

This report by the Brookings Institution examines the community development block grant program (CDBG) in its second year (1976) and focuses on the effects of decentralized decisionmaking in terms of changes in program emphasis resulting from more local decisionmaking and on alterations in the nature of HUD - local intergovernmental relations. The study is based on field analyses by resident observers in 61 jurisdictions that receive CDBG funds. The national sample takes into account the type of CDBG recipient, geographical location, population size, income level, and previous grant experience. In a summary of 1977 CDBG legislative changes it is stated that the most important change is the switch to dual formula allocation. Dual allocation retains the original formula for concentrating funds on poverty stricken communities while adding a formula for directing funds toward older cities with physical development needs. The shift to dual formula allocation significantly improved the "targeting" capabilities of the program and appears to be causing an overall increase in aid to communities in distress conditions in the northeastern and midwestern sections of the country. There has been significant decentralization of substantive decisionmaking, with local officials exercising more control over community development policy than they did under the categorical programs (those that specified particular income level requirements for eligibility). With respect to intergovernmental relations, an examination of specific cases of controversy between HUD and local jurisdictions reveals that local decisions are more likely to prevail on substantive issues -- community development strategy or program content -- than on procedural issues -- administration of compliance with environmental and affirmative action requirements. Further findings are presented; appendices contain study data, the Housing and Community Development Act of 1977, selected legal cases and complaints involving CDBG, and the study analysis form.

PB80-109556 PC **A04**/MF **A01**
Greenleigh Associates, Inc., New York.
Evaluation of the Urban Observatory Program.
Final rept.,
Beverly Philip Mazze. Jan 74, 68p HUD-0000360
Contract HUD-H-2136R

This evaluation of the Urban Observatory Program assesses the validity of the experimental hypotheses, the appropriateness and feasibility of the program's structure, and the efficiency and effectiveness of the operational procedures and requirements. Findings are based on firsthand systematic observations conducted in 10 observatories at the local program level, as well as observations at the national level. Survey instruments used to evaluate functions at the 10 sites reflected inputs, transformations, and outputs of key personnel involved in individual projects. Objectives of the program are to make university resources available to local governments to help solve urban problems, to achieve a coordinated program of continuing urban research, and to advance university capabilities to relate urban and training activities to urban concerns and conditions. Major findings include the following: (1) the city network system established by the program functions as a logical, effective, and efficient mechanism for accomplishing program objectives; (2) explicit program objectives were met to a greater degree than the implicit experimental hypotheses which relate both to the feasibility of generating general scientific knowledge about cities and the consequences of making such knowledge available to urban governments; (3) the original program objectives are still valid; (4) the program concept has had an impact on network cities relating primarily to the instituting of a system of communication between the academic community and city hall; (5) there is little transferability of project outcomes between cities; (6) the program has made no effort to demonstrate the economic or social value of projects; and (7) program benefits are significant enough to warrant extension of the network to other cities. It is recommended that the program be modified rather than terminated or continued in its current experimental form. Specific recommendations concern policy goals, program objectives, and operational procedures and requirements. Information is included on the cost of implementing the recommendations. An appendix contains supplemental charts.

PB80-109598 PC **A05**/MF **A01**
National League of Cities, Washington, DC.
Smaller-City Urban Observatory Program.
Final rept.,
Todd W. Areson, Craig P. Caywood, Susanne Hiegel, and Carol A. Patrylick. Dec 78, 95p HUD-0000366
Contract HUD-H-2196R

The Urban Observatory Program as it exists in 10 small cities with populations from 30,000 to 250,000 is examined. Central to the program concept is the hypothesis that cities and universities can derive mutual benefits from the results of academic research tailored to the problems and needs of local officials and carried out within the urban environment it proposes to study. Urban observatories are sponsored by HUD and administered by the National League of Cities (NLC). They produce research reports on such topics as municipal finance, citizen participation, housing policies, regional economic development, hiring and personnel practices, emergency medical services, charter revision, housing inspection services, and delivery of social services. Participants in the smaller - city program were selected after responses were solicited from interested cities and evaluated according to amount of commitment, evidence of previous city - university cooperation, prospective stability of city and university administrations, and availability of urban researchers. NLC provides technical assistance to cities and universities initiating observatories, monitors performance standards, facilitates the exchange of information among observatories, and coordinates network research if requested. Research findings are disseminated in a variety of ways, including distribution of reports to other observatories, acquisition of reports for the National Technical Information Service data base and HUD library, and through promotional advertising and workshops. NLC also promotes the formation of observatories in other cities and accomplishes this model transfer through surveys and data analysis, workshops using observatory, city, and university participants, and promotional materials. Observatory operations are outlined, including subcontract tasks, scope of research, research needs, organization, and funding. Overall, the Urban Observatory Program in smaller cities is concluded to be successful. City selection criteria and site visit evaluation forms are appended.

PB80-109606 PC **A03**/MF **A01**
Hittman Associations, Inc., Columbia, MD. Municipal Environmental Research Lab., Cincinnati, OH.
Operation Breakthrough Site Waste Management Systems and Pneumatic Trash Collection.
Executive summary,
Jack Preston Overman, Terry G. Statt, and David A. Kolman. 39p HUD-0000368, HUD/PDR-199/4
Contract EPA 68-03-0094

The results of studies on trash - collection methods in 10 cities at 10 housing complexes (9 were HUD - built complexes) are presented. The study objectives were to evaluate the economics, effectiveness, and feasibility of using improved solid waste collection systems in new communities, to determine the most practical, convenient, quiet, sanitary, and economical waste collection systems, and to guide development of solid waste management systems for future projects. Data were gathered during site visits. The Jersey City, N.J., pneumatic trash collection system, the main focus of the study, required an extensive, detailed investigation. Specific tests and experiments were performed to determine overall system performance. Each of the collection systems was investigated in terms of quantity of solid waste collected per type and number of containers and number and type of dwelling units; distances traveled between services and total distance to collect onsite; time spent on various collection activities including productive collection time, handling and walking time, waiting time, and time spent on other activities; mechanical equipment performance; compactor load capacity; and storage container effectiveness, sanitation, and user satisfaction. The evaluations indicate that methods used at Macon, Ga., Memphis, Tenn., Sacramento, Calif., and King County, Wash., are the most effective and economical although the pneumatic trash collection system is too costly and unreliable to justify its advantages, i.e., less noise, less tenant awareness of trash equipment, and freed service vehicles for other operations. It is concluded that single - family attached and detached housing developments are best served by curbside, weekly refuse pickup; multifamily low - rise buildings are best accommodated by curbside pickup but with centrally located containers; and household compactors can only be recommended if weekly pickup is provided and residents are taught how to use compactors. Com-

munial compactors are not recommended. Discussions and recommendations for each site are provided.

PB80-109820 PC **A02**/MF **A01**
Wilmington Office of the Mayor, DE.
Maintenance Activity Report.
Bruce Smith. Jan 79, 16p HUD-0000397

To address the gap between available resources and service demands, Wilmington, Del., officials have attempted to increase productivity of the city work force. This report describes the study process and results achieved in physical maintenance, concentrating on street cleaning, traffic maintenance, and water division maintenance operations. Project emphasis was on implementation of operational reporting mechanisms and related analytic capacities to provide improved administrative control over the operations involved. During March and April 1976, recommendations concerning street cleaning operations to the Commissioner of Public Works included improving supervision and followup activities, documenting various tasks for which crews are responsible, and mixing young and old workers on work crews (this latter practice was abandoned). Recommendations in the area of traffic maintenance operations included equipment purchases, surveys to determine functional status of street and traffic lights, reducing the number of parking meter collectors and personnel on the sign installation crew, contracting painting and sign manufacturing operations, eliminating an office aide position, merging the traffic division with other divisions, and improving inventory control. Recommendations for water division maintenance operations involved developing a reporting and control system, reevaluating replacement policy for water meters, and contracting for water main maintenance and repair. Increases in productivity have resulted in quantitative and qualitative improvements in all three areas and have caused similar action to be taken in the area of management training.

PB80-109838 PC **A02**/MF **A01**
Wilmington Commerce Dept., DE.
Study of Alternative Approaches to Motor Vehicle Maintenance.
Ed Swift. Jan 79, 20p HUD-0000398

As part of a productivity improvement effort, Wilmington, Del., experimented with various approaches to maintaining police patrol vehicles. Wilmington operated a demand driven system for its 81 police vehicles; i.e., with the exception of routine maintenance such as oil changes, the vehicles were driven until they broke down. Officials believed that maintenance could be improved by employing the following methods: (1) using planned preventive maintenance, (2) contracting with the private sector for maintenance work, or (3) holding individual officers responsible for maintaining their vehicles. Corresponding groups and a control group involving a total of 29 vehicles (mostly Belairs and Chevelles) were formed to test these hypotheses. A number of methodological problems, however, limited the usefulness of data obtained in the experiment: the sample was too small, there were no Belairs in the control group, the cars in the sample were not homogeneous, assignment to groups was probably not random, preventive maintenance schedules were not always followed, gas stations rather than garages performed preventive maintenance, mileages varied, and recordkeeping was probably inaccurate. Notwithstanding these limitations, the analytic approach used by Wilmington should be useful for performing similar analyses in other cities, and suggestions for eliminating data limitations are included. The data suggest that in - house preventive maintenance is superior in terms of cost per mile, total cost, cost per incident, and minimizing time out of service. Tables and forms accompany the text.

PB80-109903 MF **A01**
Institute for Environmental Action, Inc., New York.
The Rediscovery of the Pedestrian. Twelve European Cities.
Roberto Brambilla, and Gianni Longo. Dec 76, 123p HUD-0000010, HUD/PDR-192/2
Paper copy available from the Sup. of Docs., Stock number 023-000-00374-1

This book, an outgrowth of the More Streets for People public information program, evaluates pedestrian experiments in 12 selected European cities. It is addressed to community groups and individuals involved in promoting the creation of traffic - free areas in their cities. The cross section of European experiments represents a variety of goals and a diversity of urban scales. While the creation of urban pedestrian malls in America has focused primarily on downtown economic revitalization, a close look at European efforts reveals a number of reasons for implementing traffic - free zones. The goals sought by European planners have ranged from strictly functional ones dealing with traffic control strategies to improve downtown mobility to humanistic ones dealing with conservation of urban areas and improvement of residential conditions in central areas. The scale of the cities with pedestrian precincts also provides a useful overview for the advocate. Cars have been banned from central areas of small villages to increase tourist appeal or simply to preserve traditions of outdoor living. They have also been banned from the congested cores of cities with over a million inhabitants that possess national commercial prominence. The diverse planning context, legal methodology, and financial strategy of each specific case also provide a broad, critical picture of the process of converting vehicular roads to pedestrian thoroughfares. Some cities were chosen for their historic relevance because they clearly illustrate a variety of goals for their traffic strategies, for their focus on historic preservation, for their focus on economic revitalization, or for their innovative approach to planning and design. Although this book is not intended to furnish methodological indications tailored to the American reality, it does provide a viable framework for understanding the issues involved and the questions which should be addressed in the process of creating a traffic - free urban environment. Photographs and maps illustrate the text. (Author abstract modified).

PB80-109911 MF **A01**
Institute for Environmental Action, New York.
American Urban Malls. A Compendium.
Roberto Brambilla, Gianni Longo, and Virginia Dzurinko. Dec 76, 143p HUD-0000045, HUD/PDR-192/4
Paper copy available from the Sup. of Docs., Stock number 023-000-00376-7

This publication is an outgrowth of the More Streets for People public information program. It provides an easily understandable and comparative overview of a majority of North American pedestrianization experiments through the presentation of vital statistics and photographs of 68 malls. During 1977, every North American city with an operational pedestrian zone as of June 1976 was invited to provide information for this compendium by completing a series of questionnaires and providing a photograph and descriptive material that would best represent its mall. The data received was condensed into the following categories: statistics on the city, including population, modal split of home - to - work trips, and the number of available parking spaces in the central business district; statistics on the mall itself, including physical dimensions and methods of operation; information relating to the implementation of the project, including legislation and financing; and the name of the agency or person to contact for further data on each mall. Since the compendium illustrates the fundamental framework of traffic - free experiments of varying size and scope, it can serve as a guide to planners and urban advocates contemplating traffic bans for their cities. A key explains the symbols used in the document. Each city is treated individually, and an alphabetical index listing the cities discussed is provided. (Author abstract modified).

PB80-109929 MF **A01**
Institute for Environmental Action, Inc., New York.
Banning the Car Downtown. Selected American Cities.
Roberto Brambilla, and Gianni Longo. Dec 76, 149p HUD-0000052, HUD/PDR-192/3
Paper copy available from the Sup. of Docs., Stock number 023-000-00375-9

This book presents an indepth analysis of 16 North American pedestrianization experiments, providing information on the process which each city underwent in converting vehicular roads into malls. Some of the projects were very successful, while others represent failures. The range of results has been examined within the context of the complexity of pedestrian planning. The physical factors to be considered in the creation of a traffic - free area relate to the design of the mall and to the solution of city circulation and parking problems. These factors must be viewed in light of creating a traffic - free zone that increases not only the quality of the shopping environment but the social and recreational appeal of the area as well. The institutional side of mall implementation also affects the success of the project, because legal problems may arise in changing the use of an existing right - of - way. Legislation, which may be necessary at the local or State level, can also relate directly to financing methods. The major goal of almost every North American pedestrianization effort has been the revitalization of declining downtown retail economy. The reasons for such decline have varied from city to city. The cities considered here were selected because they represent a cross section of sizes and geographic locations. They also provide examples of the various reasons for and approaches to the implementation of traffic - free areas. Taken together, these 16 case studies offer a broad view of the aspects of pedestrian zoning in North America. Each city is considered individually, and photographs are included. (Author abstract modified).

PB80-109937 PC **A04**/MF **A01**
Keyser/Marston Associates, San Francisco, CA.
Impact of Intensive High-Rise Development in San Francisco. A Summary.
Final rept.,
Mar 75, 61p HUD-0000057

The effects of alternative patterns or scenarios of intensive high - rise development are analyzed with respect to the amount and distribution of growth in San Francisco, Calif., in or around the year 1990. The scenarios consist of maps and photographs of the commerical sector of the city; the first outlines the existing skylines and oblique projections, while four subsequent scenarios illustrate and chart expected changes wrought by committed and proposed office and hotel site development. The selected scenarios are discussed in terms of policy issues relating to environmental, transportation, municipal finance, and urban economic considerations. Study findings and conclusions, presented individually for each of these policy areas, discuss, among other things, the city's dependence on offices and hotels as an "industry," describe prototypical "industry" workers, and analyze the economic effects of an increase in the work force. Intensive high - rise development will, in addition to increasing city revenues, necessitate increased expenditures for municipal services, particularly those relating to mass transit. Increased building heights are not seen as creating necessarily commensurate increases in environmental problems relating to noise levels, air quality, views and visual impact, park use, and livability. Summary tables present the actual amounts of space, persons, revenues, and costs for 1974 and for the projected scenarios.

PB80-109945 MF **A01**
Institute for Environmental Action, Inc., New York.
Handbook for Pedestrian Action.
Roberto Brambilla, and Gianni Longo. Dec 76, 149p HUD-0000088, HUD/PDR-192/1
Paper copy available from the Sup. of Docs., Stock number 023-000-00373-2

Guidelines to converting vehicular streets to predominately pedestrian use are offered in this handbook. Two main sections concern reasons for pedestrian zoning and ways to implement pedestrian zoning. Pedestrian malls provide practical solutions to some urgent city problems: deteriorating economic and physical situations, a declining quality of life, pollution, congestion, and the flight of the middle class. The pedestrian mall can provide new life to a downtown area by improving the business of local merchants and by attracting residents from nearby suburban areas. Traffic management in central districts can improve the city's environmental quality by reducing noise and air pollution, and it also allows for the preservation of historic districts and landmarks. Tourists and residents of all ages and from all social strata are drawn to pedestrian malls which feature special amenities for relax-

ation, entertainment, and communication. Planning the pedestrian mall involves an extensive analysis of local physical, economic, and social resources. The legal aspects and funding strategies that must be examined before implementing a pedestrian mall require the participation of lawyers in both the advocacy and planning process. A close working relationship should exist between designers, contractors, and the community to express community needs. Implementation management involves an entire process which prepares for, includes, and follows construction. Guidelines and recommendations are based on data from numerous experiments documenting various approaches and their impact on city life. Numerous photographs, tables, charts, and graphs illustrate the text.

PB80-110448 PC **A12**/MF **A01**
Water Resources Council, Washington, DC.
Nationwide Analysis. Summary.
Sep 77, 259p
See also report dated Apr 78, PB-285 901.

The Nationwide Analysis was conducted by the Water Resource Council's member agencies and reflects their viewpoints about the existing and future water and related land requirements. The Summary is the primary report. Also available are 16 Appendixes and Federal Implications Workshop Reports for the 21 Water Resources Regions.

PB80-110455 PC **A03**/MF **A01**
Water Resources Council, Washington, DC.
Nationwide Analysis. Federal Implications Workshop Reports. Region 1, New England Region.
Apr 77, 43p
See also report dated Apr 78, PB-285 901.

The Nationwide Analysis was conducted by the Council's member agencies and reflects their viewpoints about the existing and future water and related land requirements. This report summarizes the findings of a Water Resource Council sponsored workshop for the New England region in late 1975.

PB80-110463 PC **A03**/MF **A01**
Water Resources Council, Washington, DC.
Nationwide Analysis. Federal Implications Workshop Reports. Region 2. Mid-Atlantic Region.
Apr 77, 42p

The Nationwide Analysis was conducted by the Water Resource Council's member agencies and reflects their viewpoints about the existing and future water and related land requirements. This report summarizes the findings of a WRC sponsored workshop for the Mid-Atlantic region in late 1975.

PB80-110471 PC **A04**/MF **A01**
Water Resources Council, Washington, DC.
Nationwide Analysis. Federal Implications Workshop Reports. Region 3. South Atlantic-Gulf Region.
Apr 77, 52p
See also PB80-110489.

The Nationwide Analysis was conducted by the Council's member agencies and reflects their viewpoints about the existing and future water and related land requirements. This report summarizes the findings of a Water Resource Council sponsored workshop for the South Atlantic Gulf region in late 1975.

PB80-110489 PC **A03**/MF **A01**
Water Resources Council, Washington, DC.
Nationwide Analysis. Federal Implications Workshop Reports. Region 4. Great Lakes Region.
Apr 77, 41p
See also PB80-110497.

The Nationwide Analysis was conducted by the Water Resource Council's member agencies and reflects their viewpoints about the existing and future water and related land requirements. This report summarizes the findings of a WRC sponsored workshop for the Great Lakes region in late 1975.

PB80-110497 PC **A03**/MF **A01**
Water Resources Council, Washington, DC.
Nationwide Analysis. Federal Implications Workshop Reports. Region 5. Ohio Region.
Apr 77, 42p
See also PB80-110505.

The Nationwide Analysis was conducted by the Council's member agencies and reflects their viewpoints about the existing and future water and related land requirements. This report summarizes the findings of a Water Resource Council sponsored workshop for the Ohio region in late 1975.

PB80-110505 PC **A03**/MF **A01**
Water Resources Council, Washington, DC.
Nationwide Analysis. Federal Implications Workshop Reports. Region 6. Tennessee Region.
Apr 77, 33p
See also PB80-110513.

The Nationwide Analysis was conducted by the Council's member agencies and reflects their viewpoints about the existing and future water and related land requirements. This report summarizes the findings of a Water Resource Council sponsored workshop for the Tennessee region in late 1975.

PB80-110513 PC **A03**/MF **A01**
Water Resources Council, Washington, DC.
Nationwide Analysis. Federal Implications Workshop Reports. Region 7. Upper Mississippi Region.
Apr 77, 42p
See also PB80-110521.

The Nationwide Analysis was conducted by the Council's member agencies and reflects their viewpoints about the existing and future water and related land requirements. This report summarizes the findings of a Water Resource Council sponsored workshop for the Upper Mississippi region in late 1975.

PB80-110521 PC **A03**/MF **A01**
Water Resources Council, Washington, DC.
Nationwide Analysis. Federal Implications Workshop Reports. Region 8. Lower Mississippi Region.
Apr 77, 37p
See also PB80-110539.

The Nationwide Analysis was conducted by the Council's member agencies and reflects their viewpoints about the existing and future water and related land requirements. This report summarizes the findings of a Water Resource Council sponsored workshop for the Lower Mississippi region in late 1975.

PB80-110539 PC **A03**/MF **A01**
Water Resources Council, Washington, DC.
Nationwide Analysis. Federal Implications Workshop Reports. Region 9. Souris-Red-Rainy Region.
Apr 77, 34p
See also PB80-110547.

The Nationwide Analysis was conducted by the Water Resource Council's member agencies and reflects their viewpoints about the existing and future water and related land requirements. This report summarizes the findings of a WRC sponsored workshop for this region in late 1975.

PB80-110547 PC **A04**/MF **A01**
Water Resources Council, Washington, DC.
Nationwide Analysis. Federal Implications Workshop Reports. Region 10. Missouri Region.
Apr 77, 52p
See also PB80-110554.

The Nationwide Analysis was conducted by the Water Resource Council's member agencies and reflects their viewpoints about the existing and future water and related land requirements. This report summarizes the findings of a WRC sponsored workshop for the Missouri region in late 1975.

PB80-110554 PC **A03**/MF **A01**
Water Resources Council, Washington, DC.
Nationwide Analysis. Federal Implications Workshop Reports. Region 11. Arkansas-White-Red Region.
Apr 77, 44p
See also PB80-110562.

The Nationwide Analysis was conducted by the Water Resource Council's member agencies and reflects their viewpoints about the existing and future water and related land requirements. This report summarizes the findings of a WRC sponsored workshop for the South Central Region of the United States in 1975.

PB80-110562 PC **A03**/MF **A01**
Water Resources Council, Washington, DC.
Nationwide Analysis. Federal Implications Workshop Reports. Region 12. Texas Gulf Region.
Apr 77, 43p
See also PB80-110570.

The Nationwide Analysis was conducted by the Water Resource Council's member agencies and reflects their viewpoints about the existing and future water and related land requirements. This report summarizes the findings of a WRC sponsored workshop for the Texas Gulf Region in 1975.

PB80-110570 PC **A03**/MF **A01**
Water Resources Council, Washington, DC.
Nationwide Analysis. Federal Implications Workshop Reports. Region 13. Rio Grande Region.
Apr 77, 44p
See also PB80-110588.

The Nationwide Analysis was conducted by the Water Resource Council's member agencies and reflects their viewpoints about the existing and future water and related land requirements. This report summarizes the findings of a WRC sponsored workshop for Rio Grande region in late 1975.

PB80-110588 PC **A03**/MF **A01**
Water Resources Council, Washington, DC.
Nationwide Analysis. Federal Implications Workshop Reports. Region 14. Upper Colorado Region.
Apr 77, 34p
See also PB80-110596.

The Nationwide Analysis was conducted by the Water Resource Council's member agencies and reflects their viewpoints about the existing and future water and related land requirements. This report summarizes the findings of a WRC sponsored workshop for the Upper Colorado region in late 1975.

PB80-110596 PC **A03**/MF **A01**
Water Resources Council, Washington, DC.
Nationwide Analysis. Federal Implications Workshop Reports. Region 15. Lower Colorado Region.
Apr 77, 36p
See also PB80-110604.

The Nationwide Analysis was conducted by the Water Resource Council's member agencies and reflects their viewpoints about the existing and future water and related land requirements. This report summarizes the findings of a WRC sponsored workshop for the Lower Colorado region in late 1975.

PB80-110604 PC **A03**/MF **A01**
Water Resources Council, Washington, DC.
Nationwide Analysis. Federal Implications Workshop Reports. Region 16. Great Basin Region.
Apr 77, 35p
See also PB80-110612.

The Nationwide Analysis was conducted by the Water Resource Council's member agencies and reflects their viewpoints about the existing and future water and related land requirements. This report summarizes the findings of a WRC sponsored workshop for the Great Basin region in late 1975.

PB80-110612 PC **A03**/MF **A01**
Water Resources Council, Washington, DC.

Nationwide Analysis. Federal Implications Workshop Reports. Region 17. Pacific Northwest Region.
Apr 77, 41p
See also PB80-110620.

The Nationwide Analysis was conducted by the Water Resource Council's member agencies and reflects their viewpoints about the existing and future water and related land requirements. This report summarizes the findings of a WRC sponsored workshop for the Pacific Northwest region in late 1975.

PB80-110620 PC **A03**/MF **A01**
Water Resources Council, Washington, DC.
Nationwide Analysis. Federal Implications Workshop Reports. Region 18. California-South Pacific Region.
Apr 77, 42p
See also PB80-110638.

The Nationwide Analysis was conducted by the Water Resource Council's member agencies and reflects their viewpoints about the existing and future water and related land requirements. This report summarizes the findings of a WRC sponsored workshop for the region in late 1975.

PB80-110638 PC **A03**/MF **A01**
Water Resources Council, Washington, DC.
Nationwide Analysis. Federal Implications Workshop Reports. Region 19. Alaska Region.
Apr 77, 34p
See also PB80-110646.

The Nationwide Analysis was conducted by the Water Resource Council's member agencies and reflects their viewpoints about the existing and future water and related land requirements. This report summarizes the findings of a WRC sponsored workshop for the Alaska region in late 1975.

PB80-110646 PC **A03**/MF **A01**
Water Resources Council, Washington, DC.
Nationwide Analysis. Federal Implications Workshop Reports. Region 20. Hawaii Region.
Apr 77, 32p
See also PB80-110653.

The Nationwide Analysis was conducted by the Water Resource Council's member agencies and reflects their viewpoints about the existing and future water and related land requirements. This report summarizes the findings of a WRC sponsored workshop for the Hawaii region in late 1975.

PB80-110653 PC **A03**/MF **A01**
Water Resources Council, Washington, DC.
Nationwide Analysis. Federal Implications Workshop Reports. Region 21. Caribbean Region.
Apr 77, 34p
See also PB80-110661.

The Nationwide Analysis was conducted by the Water Resource Council's member agencies and reflects their viewpoints about the existing and future water and related land requirements. This report summarizes the findings of a WRC sponsored workshop for the Caribbean region in late 1975.

PB80-110661 PC **A07**/MF **A01**
Water Resources Council, Washington, DC.
Nationwide Analysis. Appendix A-1. Population, Personal Income and Earnings-Projections and Historic Data.
Jun 74, 127p
See also report dated Apr 78, PB-285 901.

The Nationwide Analysis was conducted by the Water Resource Council's member agencies and reflects their viewpoints about the existing and future water and related land requirements. The report contains historical (1950, 1962, 1969, 1970, and 1971), base year (1975), and projected (1980, 1985, 1990, and 2000) data for population, employment, personal income, and earnings.

PB80-110679 PC **A06**/MF **A01**
Water Resources Council, Washington, DC.
Nationwide Analysis. Appendix A-2. Population, Personal Income and Earnings-Incremental Projections and Ratios.
Jun 75, 119p
See also PB80-110687.

The Nationwide Analysis was conducted by the Water Resource Council's member agencies and reflects their viewpoints about the existing and future water and related land requirements, the character of the problems and conflicts associated with meeting these requirements, and the attendant implications for the future. The report contains incremental projections and ratios of future values (1985 and 2000) to current values (1975) for population, employment, personal income, and earnings.

PB80-110695 PC **A03**/MF **A01**
Water Resources Council, Washington, DC.
Nationwide Analysis. Appendix C-1. Livestock Water Use.
Jul 75, 46p
See also PB80-110703.

The Nationwide Analysis was conducted by the Water Resource Council's member agencies and reflects their viewpoints about the existing and future water and related land requirements. The report provides livestock water use estimates and describes severe livestock water-related problems.

PB80-110703 PC **A03**/MF **A01**
Water Resources Council, Washington, DC.
Nationwide Analysis. Appendix C-2. Domestic Water Use from Non-Central Systems.
Jul 75, 38p
See also PB80-110711.

The Nationwide Analysis was conducted by the Water Resource Council's member agencies and reflects their viewpoints about the existing and future water and related land requirements. The report presents data on the number of people on central and self-supplied systems, annual domestic noncentral water use, and monthly variations in water use.

PB80-110711 PC **A03**/MF **A01**
Water Resources Council, Washington, DC.
Nationwide Analysis. Appendix C-3. Domestic Water Use from Central Systems.
Jul 75, 32p
See also PB80-110729.

The Nationwide Analysis was conducted by the Water Resource Council's member agencies and reflects their viewpoints about the existing and future water and related land requirements. The report presents data on the number of people on central systems, annual domestic central water use, and monthly variations in water use.

PB80-110729 PC **A08**/MF **A01**
Water Resources Council, Washington, DC.
Nationwide Analysis. Appendix D. Outdoor Recreation Requirements and Related Problem Issues.
May 75, 171p
See also PB80-110737.

The Nationwide Analysis was conducted by the Water Resource Council's member agencies and reflects their viewpoints about the existing and future water and related land requirements. The report provides information on current (1975) and future (1985 and 2000) water and related land resources needed to support projected outdoor recreation use. It also identifies water-related recreation problem issues and describes areas of critical environmental concern.

PB80-110737 PC **A03**/MF **A01**
Water Resources Council, Washington, DC.
Nationwide Analysis. Appendix E. Endangered and Threatened Species.
Jun 76, 26p
See also PB80-110745.

The Nationwide Analysis was conducted by the Water Resource Council's member agencies and reflects their viewpoints about the existing and future water and related land requirements. The report lists the endangered species as of June 1976 by water resources aggregated subareas.

PB80-110752 PC **A10**/MF **A01**
Water Resources Council, Washington, DC.
Nationwide Analysis. Appendix H. Energy and Related Water Requirements.
Apr 77, 208p
See also PB-254 853.

The Nationwide Analysis was conducted by the Water Resource Council's member agencies and reflects their viewpoints about the existing and future water and related land requirements. The report gives information on historical and projected energy use at the national level and on current (1975) and estimated (1985 and 2000) steam and hydroelectric capacity and generation, residual heat discharges by steam electric plants, and water requirements for energy production by aggregated subarea.

PB80-110760 PC **A03**/MF **A01**
Water Resources Council, Washington, DC.
Nationwide Analysis. Appendix I. Economic Development, Water Requirements, and Water-Related Problems on Federal Indian Reservations.
Jun 77, 46p
See also PB80-110778.

The Nationwide Analysis was conducted by the Water Resource Council's member agencies and reflects their viewpoints about the existing and future water and related land requirements. The report presents the results of a study of Federal Indian Reservations that was undertaken to forecast their potential for economic development, to project their water use requirements and to identify their water and water-related problems.

PB80-110778 PC **A08**/MF **A01**
Water Resources Council, Washington, DC.
Nationwide Analysis. Appendix J. Water Use Price/Cost Sensitivity Analysis.
Jun 76, 169p
See also PB80-110786.

The Nationwide Analysis was conducted by the Water Resource Council's member agencies and reflects their viewpoints about the existing and future water and related land requirements. The report provides a summary of several technical studies undertaken to estimate the possible effect of higher water prices on water use in several major sectors.

PB80-110786 PC **A09**/MF **A01**
Water Resources Council, Washington, DC.
Nationwide Analysis. Appendix K. Water Quality Concerns Present and Future.
Jun 76, 195p
See also PB80-110794.

The Nationwide Analysis was conducted by the Water Resource Council's member agencies and reflects their viewpoints about the existing and future water and related land requirements. The report provides information on point and nonpoint discharges of four wastewater variables: biochemical oxygen demand, total suspended solids, nitrogen, and phosphorus. It also presents information on toxic wastes and related problems.

PB80-110794 PC **A03**/MF **A01**
Water Resources Council, Washington, DC.
Nationwide Analysis. Appendix L. Toward a Structured Ecological Data Base.
Jun 76, 37p
See also PB80-110802.

The Nationwide Analysis was conducted by the Water Resource Council's member agencies and reflects their viewpoints about the existing and future water and related land requirements. The report describes the National Wetlands Inventory and Habitat Classification and Analysis, two major fish and wildlife habitat information projects of the Fish and Wildlife Service.

PB80-110802 PC **A12**/MF **A01**
Water Resources Council, Washington, DC.
Nationwide Analysis. Appendix M. Agricultural Resources Assessment System. Volume I.
Apr 78, 271p
See also PB80-110448.

A comprehensive study was made to project the behavior of U.S. agriculture in 1985 and 2000 to

provide a basis for estimating agricultural water needs and evaluate the impacts of regional water shortages. This was input to the 1975 National Water Assessment study sponsored by the U.S. Water Resources Council. A national linear programming model was used to estimate how farmers in various regions of the United States would use their land, water, labor and capital resources to meet domestic and export commodity demands in the future. Environment implications--soil erosion and effects on wildlife habitat--were also estimated.

PB80-111958 PC **A06**
Golden Empire Transit District, Bakersfield, CA.
Golden Empire Transit District Short Range Transit Plan, FY 1979/80 - FY 1983/84,
William J. Kelly. 1979, 122p UMTA-CA-09-0076-79-1

The report presents an analysis of the Golden Empire Transit District to determine operations and service improvement needs over the next five years. The report addresses all of the points of the Region IX UMTA Short Range Transit Planning Guidelines at a level of detail appropriate for an urban area of under 200,000 population.

PB80-112659 PC **A08**/MF **A01**
Industrial Gas Cleaning Inst., Inc., Alexandria, VA.
Assessment of Manufacturers' Capabilities to Meet Requirements for Control of Emissions of Sulfur Dioxide, Particulate Matter, and Nitrogen Oxides from Industrial Boilers.
Final rept.
Oct 79, 155p EPA/450/5-79/011
Contract EPA-68-02-2532

The report reviews the capabilities of manufacturers of air pollution control equipment to produce sufficient numbers of control devices for new industrial boilers with heat inputs greater than 2.9 MW thermal, should regulations be promulgated. The report covers the period 1981 to 1995. The supply of flue gas desulfurization systems will be inadequate if controls are required on small boilers. The supply of systems to control particulate matter emissions, however, should be satisfactory. The industry providing systems to treat nitrogen oxides in flue gas is poorly developed and apparently could not supply enough systems for all industrial boilers. Limited data are available about combustion modification for nitrogen oxide control, but the combustion modification industry appears abler than the flue gas treatment industry to meet a demand for more stringent control of nitrogen oxide emissions.

PB80-113103 PC **A08**/MF **A01**
Oak Ridge National Lab., TN.
Movement of Hazardous Substances in Soil: A Bibliography. Volume 1. Selected Metals.
Final rept.,
Emily D. Copenhaver, and Benia K. Wilkinson.
Aug 79, 152p EPA/600/9-79/024A
See also Volume 2, PB80-113111.

This bibliography is intended for use by personnel concerned, either via research or management, with the disposal of hazardous wastes, other than sewage sludge, on land. It is the result of a search of recent literature (1970 through 1974) and includes information on the transport, transformation, and soil retention of arsenic, asbestos, beryllium, cadmium, chromium, copper, cyanide, lead, mercury, selenium, zinc, halogenated hydrocarbons, pesticides, and other hazardous substances. The bibliography has been divided into two volumes to facilitate its use. Volume 1 contains all the hazardous substances studied except pesticides.

PB80-113111 PC **A11**/MF **A01**
Oak Ridge National Lab., TN.
Movement of Hazardous Substances in Soil: A Bibliography. Volume 2. Pesticides.
Final rept.,
Emily D. Copenhaver, and Benita K. Wilkinson.
Aug 79, 235p EPA/600/9-79/024B
See also Volume 1, PB80-113103.

This bibliography is intended for use by personnel concerned, either via research or management, with the disposal of hazardous wastes, other than sewage sludge, on land. It is the result of a search of recent literature (1970 through 1974) and includes information on the transport, transformation, and soil retention of arsenic, asbestos, beryllium, cadmium, chromium, copper, cyanide, lead, mercury, selenium, zinc, halogenated hydrocarbons, pesticides, and other hazardous substances. The literature search focused on processes directly related to transport (adsorption, ion exchange, etc.) and documentation of the occurrence and extent of transport. The bibliography has been divided into two volumes to facilitate its use. Volume 2 contains the pesticide citations.

PB80-113673 PC **A21**/MF **A01**
Chuo Univ., Tokyo (Japan).
NOx Abatement for Stationary Sources in Japan.
Annual rept. Jun 78-Jun 79,
Jumpei Ando. Aug 79, 496p EPA/600/7-79/205
Contract EPA-68-02-2161
See also report dated Sep 77, PB-276 948.

The report describes current NOx air pollution problems in Japan and the methods used there to control NOx emissions from stationary sources. The two most common techniques in use are combustion modifications and flue gas treatment (FGT). FGT technologies have been developed more extensively in Japan than in any other country as a result of Japan's stringent NOx emission standards. The various NOx control technologies are examined with respect to both principles of operation and specific process applications. Currently the most popular (over 60 commercial applications) FGT technology is selective catalytic reduction. This technology is capable of 80-90% NOx control and has the lowest cost per kilogram of NOx removed. Recently catalysts have been developed that are resistant to particulate plugging and appear to be applicable to coal-fired boilers in the U.S. Cost and commercial performance data, based on Japanese installations, are presented in much greater detail than was previously available.

PB80-113681 PC **A09**/MF **A01**
Brown and Caldwell, Seattle, WA.
Novel Methods and Materials of Construction.
Final rept.,
A. F. Harber, and R. C. Bain, Jr. Jul 79, 191p
EPA/600/2-79/079
Contract EPA-68-03-2512

The purpose of this study was to identify the structural and nonstructural factors which influence the cost of construction of municipal wastewater treatment plants and to determine if construction costs could be reduced through the modification of the nonstructural factors or the use of unconventional or novel methods and materials of construction. For nonstructural factors or problems, solutions are posed for some of the identified problems and these are ranked in terms of their potential for implementation and cost savings. Within the top six ranked solutions two involved expansion of the facility planning phase, two involved design criteria while the remaining top ranked solutions involved fast track construction management procedures and adoption of novel ideas. From the structural aspect, those unconventional materials or methods of construction identified as feasible and cost effective were flexible (in situ formed) pipe liner which enables sewers to be relined using existing access, plastic fluid control equipment, and several fiberglass reinforced plastic (FRP) applications including digester covers, small diameter piping and access bridges for walkways over clarifiers and other process units. The most readily implementable novel concepts identified were vertical shaft construction methods and applications, precast concrete tanks, and reinforced asphalt pond liners. The best ideas identified as requiring further study are shipboard treatment and botanical foul air treatment. Other ideas including those considered non-cost effective are identified.

PB80-114283 PC **A18**/MF **A01**
University of Central Florida, Orlando. Dept. of Civil Engineering and Environmental Science.
Municipal Solid Waste: Resource Recovery. Proceedings of the Annual Research Symposium (5th) Held at Orlando, Florida on March 26, 27, and 28, 1979,
Martin P. Wanielista, James S. Taylor, and John Larson. Aug 79, 424p EPA/600/9-79/023B
Grant EPA-R-806198

Volume II, Resource Recovery, covered five primary technical areas: Evaluation of Equipment, Unit Operations, and Processes; Economics and Impediments; Systems Analysis and Special Studies; Utilization of Recovered Materials; and Environmental Impacts of Resource Recovery.

PB80-114291 PC **A19**/MF **A01**
University of Central Florida, Orlando. Dept. of Civil Engineering and Environmental Science.
Municipal Solid Waste: Land Disposal. Proceedings of the Annual Research Symposium (5th) Held at Orlando, Florida, March 26, 27, and 28, 1979,
Martin P. Wanielista, and James S. Taylor. Aug 79, 437p EPA/600/9-79/023A
See also PB80-114283.

Volume I, Land Disposal, covered four primary technical areas: Pollutant Identification, Environmental Assessment, Control Technology, and Pollutant Transport.

PB80-801822 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Fly Ash. Volume 2. 1976-1977 (Citations from the NTIS Data Base).
Rept. for 1976-77,
Diane M. Cavagnaro. Dec 79, 157p
For the companion Published Searches of the Engineering Index Data Base, see NTIS/PS-76/0718, NTIS/PS-78/1071, and PB80-801848. See also Volume 1, 1964-1975, NTIS/PS-77/0923.

This bibliography cites Federally funded research reports on fly ash generation, collection, disposal, and utilization. Dust collection devices, filters, precipitators, and scrubbers are included. The use of fly ash in soil stabilization, roads, cements, construction materials, and as absorbents are also covered. Additives for fly ash conditioning and combustion modification are studied, as well as fly ash analysis and fly ash related pollution sampling. (This updated bibliography contains 149 abstracts, none of which are new entries to the previous edition.)

PB80-801830 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Fly Ash. Volume 3. 1978-November, 1979 (Citations from the NTIS Data Base).
Rept. for 1978-Nov 79,
Mona F. Smith. Dec 79, 207p
Supersedes NTIS/PS-78/1070, NTIS/PS-77/0923, NTIS/PS-76/0717, NTIS/PS-75/646, and NTIS/PS-75/133. For the companion Published Searches of the Engineering Index Data Base, see NTIS/PS-76/0718, NTIS/PS-78/1071, and PB80-801848. See also Volume 1, 1964-1975, NTIS/PS-77/0922, and Volume 2, 1976-1977, PB80-801822.

Government-sponsored research on fly ash generation, collection, disposal, and use is cited in the compilation. Studies on dust collection devices, filters, precipitators, and scrubbers are included. Additives for fly ash conditioning and combustion modification are studied, as well as fly ash analysis and fly ash related pollution sampling. The use of fly ash in soil stabilization, roads, cements, construction materials, and as absorbents are also covered. (This updated bibliography contains 201 abstracts, 132 of which are new entries to the previous edition.)

PB80-801848 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Fly Ash. Volume 3. November, 1977-November, 1979 (Citations from the Engineering Index Data Base).
Rept. for Nov 77-Nov 79,
Diane M. Cavagnaro. Dec 79, 263p
Supersedes NTIS/PS-78/1072, NTIS/PS-77/0924 and NTIS/PS-76/0719. For the companion Published Searches of the NTIS Data Base, see NTIS/PS-77/0922, PB80-801822, and PB80-801830. See also Volume 1, 1970-1974, NTIS/PS-76/0718 and Volume 2, 1975-October, 1977, NTIS/PS-78/1071.

Worldwide research is cited on fly ash as pertaining to pollution aspects. These studies cover fly ash scrubbing and collection, chemical analysis, utilization, and air pollution control equipment performance. The majority of these abstracts deal with electric power plants, fly ash use in cement and roadbeds, and waste disposal. Discussions of metal extraction and recovery from fly ash are included. (This updated bibliography contains 201 abstracts, 132 of which are new entries to the previous edition.)

PB80-801863 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Air Pollution Effects on Materials (Citations from the NTIS Data Base).
Rept. for 1964-Oct 79,
William E. Reed. Dec 79, 160p
Supersedes NTIS/PS-78/1073, NTIS/PS-77/0912, NTIS/PS-76/0854, NTIS/PS-75/760, and NTIS/PS-74/113. For the companion Published Search of the American Petroleum Institute Data Base, see PB80-801871.

The bibliography contains selected research reports on corrosion and damage by air pollution and includes studies on the effects upon steel, textiles, and building materials. Many studies cover a specific pollutant and its corrosive or damaging properties. (This updated bibliography contains 151 abstracts, 27 of which are new entries to the previous edition.)

PB80-801871 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Air Pollution Effects on Materials (Citations from the American Petroleum Institute Data Base).
Rept. for 1971-Sep 79,
William E. Reed. Dec 79, 76p
For the companion Published Search of the NTIS Data Base, see PB80-801863.

The bibliography contains selected research reports from worldwide literature on corrosion and damage by air pollution and includes studies on the effects upon steel, textiles, and building materials. Many studies cover a specific pollutant and its corrosive or damaging properties. (This updated bibliography contains 78 abstracts, 9 of which are new entries to the previous edition.)

PB80-801939 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Oil Water Separators (Citations from the NTIS Data Base).
Rept. for 1964-Dec 79,
Edward J. Lehmann. Dec 79, 157p
Supersedes NTIS/PS-78/1256, NTIS/PS-78/1004, NTIS/PS-76/0863, and NTIS/PS-75/710. For the companion Published Searches of the Engineering Index and American Petroleum Institute Data Bases respectively, see PB80-801947 and PB80-801954.

The citations cover Federally-sponsored research on these devices, primarily for oil pollution control. Centrifuge separators, coalescers, filters, and skimmers are included. Oil recovery from oil spills, and separation from ballast and bilge water are also cited. The operation, testing, and performance of this equipment in the laboratory and in the field are reported. (This updated bibliography contains 148 abstracts, 2 of which are new entries to the previous edition.)

PB80-801947 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Oil Water Separators (Citations from the Engineering Index Data Base).
Rept. for 1970-79,
Edward J. Lehmann. Dec 79, 138p
Supersedes NTIS/PS-78/1257. For the companion Published Search of the NTIS Data Base, see PB80-801939.

Worldwide journal research is cited on these devices, mainly for water pollution control. A range of equipment is described, including gravity separators, centrifuges, membranes, coalescers, filters, distillation columns, and flotation units. Oil recovery from oil spills is covered. Separation of these components in ballast and bilge water, factory effluents, petroleum refineries, and waste oil treatment is studied. Design, operation, costs, testing, and efficiency of these articles are reported. (This updated bibliograhy contains 132 abstracts, 4 of which are new entries to the previous edition.)

PB80-801954 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Oil Water Separators (Citations from the American Petroleum Institute Data Base).
Rept. for 1973-Sep 78,
Edward J. Lehmann. Dec 79, 146p
Supersedes NTIS/PS-78/1258. For the companion Published Search of the NTIS Data Base, see PB80-801939.

Citations cover research on these devices primarily for oil pollution control. Equipment studied includes coalescers, filters, skimmers, scrubbers, absorbers, centrifuges, and sweeps. Oil recovery from oil spills, separation from bilge and ballast water, and removal from petroleum refinery effluents are described. The operation, testing, and performance of this equipment in the laboratory and in the field are reported. (This updated bibliography contains 158 abstracts, 18 of which are new entries to the previous edition.)

PB80-802069 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Natural Gas Pipeline Construction (Citations from the Engineering Index Data Base).
Rept. for 1970-Nov 79,
Guy E. Habercom, Jr. Dec 79, 225p
Supersedes NTIS/PS-78/1181 and NTIS/PS-77/1055.

Construction techniques, materials, and construction difficulties are reviewed in these reports gathered from a worldwide literature survey. Budget costs, safety, and legal aspects are investigated. Problems peculiar to cold weather and underwater construction are considered. (This updated bibliography contains 249 abstracts, 30 of which are new entries to the previous edition.)

PB80-802283 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Bridges: Construction and Construction Materials. Volume 3. December, 1977-November, 1979 (Citations from the NTIS Data Base).
Rept. for Dec 77-Nov 79,
Guy E. Habercom, Jr. Dec 79, 184p
Supersedes NTIS/PS-78/1232, NTIS/PS-77/1149, NTIS/PS-76/1052, NTIS/PS-75/888, and NTIS/PS-75/076. For the companion Published Searches of the Engineering Index Data Base, see NTIS/PS-76/1053 and PB80-802291. See also Volume 1, 1964-November, 1975, NTIS/PS-76/1051 and Volume 2, December, 1975-November, 1977, NTIS/PS-78/1231.

Bridge design, construction, construction materials, and the structural/mechanical properties are investigated in these Government-sponsored research reports. Bridge decks, approaches, piers, and foundations are mong the salient features reviewed. (This updated bibliography contains 176 abstracts, 83 of which are new entries to the previous edition.)

SAND-79-8246 PC **A03**/MF **A01**
Sandia Labs., Albuquerque, NM.
Optical Particulate Size Measurements Using a Small-Angle Near-Forward Scattering Technique.
J. C. F. Wang. Jul 79, 48p CONF-790740-1
Contract EY-76-C-04-0789
Symposium on transfer and utilization of particulate control technology, Denver, CO, USA, 23 Jul 1979.

Techniques for measuring particle size distributions in the range of 1 to 50 mu m based on light scattering principles were reviewed and examined to define appropriate diagnostic tools for applications in fossil fuel combustor environments of advanced power systems. Light scattering at forward small angles (1 to 5 exp 0) was identified as one of the most promising optical techniques based on a systematic theoretical investigation using Mie calculations. To verify the theoretical predictions, a laboratory bench experiment was initiated in this near-forward small-angle configuration using monodispersed and polydispersed particles of known physical properties of different refractive indices and sizes. (ERA citation 04:050565)

UCRL-82761 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Physical and Chemical Characterization of Aerosol Emissions from Coal-Fired Power Plants.
J. M. Ondov, and A. H. Biermann. 25 Jun 79, 16p CONF-790458-3
Contract W-7405-ENG-48
Symposium on environmental and climatic impact of coal utilization, Williamsburg, VA, USA, 17 Apr 1979.

Conventional power plants, fired by pulverized coal, are the largest single anthropogenic source of atmospheric fine particles and sulfur oxides and the second largest source of nitrogen oxides. Associated with the atmospheric emission of fine particulate matter and oxides of sulfur and nitrogen is the concurrent release of potentially toxic trace elements and heavy metals, naturally occuring radionuclides, and potentially carcinogenic organic and inorganic compounds. We have examined physical and chemical properties of particulate emissions from eight different boilers all burning pulverized coal and equipped with either hot or cold-side electrostatic precipitators or venturi wet scrubbers. The results of these studies, including classification of morphology, measurement of distribution parameters of aerosol particles, and comprehensive analyses of fly-ash particles for trace elements, heavy metals and radionuclides are discussed. However they are formed, these particles serve as surfaces for the condensation or adsoprtion of substances volatilized during combustion. Davison et al. demonstrated an inverse size dependence of the concentration of many elements in coal fly ash. This is indeed the behavior one would expect if some portion of the element resided in a relatively thin surface layer that was deposited from the gas phase. (ERA citation 04:048538)

UCRL-83010 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Effective H sub 2 S Abatement Process Using Geothermal Brine Effluents.
R. Quong, K. G. Knauss, N. D. Stout, and L. B. Owen. 16 Jul 79, 4p CONF-790906-17
Contract W-7405-ENG-48
Geothermal Resources Council annual meeting, Reno, NV, USA, 24 Sep 1979.

A simple and potentially inexpensive method for removal of H sub 2 S from noncondensible gases evolved in geothermal flash processes has been successfully tested on a small scale in the field. The method consists of scrubbing the noncondensible gases of H sub 2 S with brine effluents which contain relatively high concentrations of Pb, Zn, and Fe such as those of the Salton Sea and Brawley Geothermal Fields in the Imperial Valley, California. For plant applications, noncondensibles including H sub 2 S would be ejected from a surface steam condenser (necessary to minimize the volume of liquid in contact with H sub 2) and scrubbed with effluent brine just prior to preinjection clarification. The metal sulfide precipitates are removed in the clarification step and the noncondensibles, less H sub 2 S, are vented as usual. (ERA citation 04:051373)

UT/CES-ES-1 PC **A07**/MF **A01**
Texas Univ. at Austin. Center for Energy Studies.
Evaluation of the Restrictiveness of Texas Air Control Board Regulation V on Control of Volatile Organic Compound Emissions from Petroleum Storage and Other Facilities.
M. L. Magee, and H. B. H. Cooper, Jr. Jun 78, 143p

Texas Air Control Board Regulation V is the volatile organic compound control regulation for the State of Texas, and its primary purpose is to mini-

mize the potential for formation of photochemical oxidants, or smog. Regulation V presently contains provisions for the control of volatile organic emissions from general storage, loading and unloading, water separation, waste gas disposal, storage of crude oil or condensate, and filling of gasoline storage vessels. A cost effectiveness study for control of emissions from crude oil storage tanks shows that a net annual savings is realized for most tanks because of the value of product recovered. In a comparative analysis of organic compound control regulations, Regulation V is found to impose control requirements of greater restrictiveness than most other states, and of variable restrictiveness compared with Federal reasonably available control technology (RACT) guidelines and Federal promulgations. The continued implementation of an oxidant control strategy for the State of Texas will require a rigorous, scientific approach to the gathering and evaluation of data if the goal of clean air is to be achieved through rational and reasonable means. (ERA citation 04:032339)

UT/CES-ES-5 PC **A04**/MF **A01**
Texas Univ. at Austin. Center for Energy Studies.
Energy and Environmental Analysis of a Proposed Coal Rail Haul Rate Increase. Environmental Study No. 5.
H. B. H. Cooper, Jr., R. W. Miksad, and E. G. Fruh. Aug 78, 61p

An analysis has been made of the potential environmental impacts of the request by the Burlington Northern Railroad for a proposed rate increase to haul coal from a mine in Wyoming to the J.T. Dealy coal-fired power plant of the San Antonio City Public Service Board. The proposed rate increase by the railroad would raise the cost of moving the coal from the present $11.94 per ton to $18.23 per ton; the effect would be to make the coal less competitive than fuel oil and to cause increased oil burning at the V.H. Braunig and O.W. Sommers plants. This proposed action would affect the distribution of the types and amounts of fuel supplies used with resultant environmental impacts on air pollutant emissions, air quality levels and water quality parameters. (ERA citation 04:028962)

13C. Construction Equipment Materials, and Supplies

APL/JHU-SR-79-1 PC **A14**/MF **A01**
Johns Hopkins Univ., Laurel, MD. Applied Physics Lab.
Lightweight Concrete Development Program, Phase I. Special Reports.
J. S. O'Connor. Apr 79, 319p
Contract EG-77-A-29-1076

Two lightweight structural concrete mixes having average inplace unit weights in the range of 86 to 91 pcf (lb/ft exp 3) and compressive design strengths, f/sub c/', greater than 4000 psi have been produced for use in the cold-water pipe (CWP) of an Ocean Thermal Energy Conversion (OTEC) pilot plantship. Reinforced concrete is a desirable material for constructing a CWP because of its low cost, durability, low corrosion and compatibility problems, and its long history of marine use. The use of lightweight concrete reduces the dynamic loads on the pipe and the cost of pipe handling and deployment. The steps that were taken in selecting specific concrete mixes are described and the properties of the approved mixes are given. Designs and cost estimates are given for constructing a CWP using lightweight concrete and a test program is presented for generating additional data. (ERA citation 04:052881)

COO-4929-1 PC **A02**/MF **A01**
Portland Cement Association, Skokie, IL.
Use of Precalciners to Remove Alkali from Raw Material in the Cement Industry. Quarterly Technical Progress Report, August-October 1978.
F. M. Miller. Nov 78, 18p
Contract EM-78-C-02-4929

A literature survey assisted in defining the role of CaCl sub 2 and limitations on its applicability to alkali reduction experimentation. Additional insight into the mechanism and parameters of heat exchange in the precalciner-type kiln systems has been gained from the literature search, which culminated in the preparation of the bibliography covering thermal treatment of raw materials. Experiments investigating the efficiency of alkali volatization from pure argillaceous minerals are underway. Initial results have been encouraging, as significant fractions of total alkali were volatilized even under the static conditions employed. Clay minerals were, rather surprisingly, more resistant to alkali removal than feldspars when CaCl sub 2 was used. This may indicate that their structure collapsed upon removal of some alkali, and that CaCO sub 3 should be added to the clay burns. (ERA citation 04:053403)

COO-4929-3 PC **A02**/MF **A01**
Portland Cement Association, Skokie, IL.
Use of Precalciners to Remove Alkalies from Raw Materials in the Cement Industry. Quarterly Technical Progress Report, February--April 1979.
E. M. Gartner. May 79, 14p
Contract EM-78-C-02-4929

Laboratory tests designed to evaluate the volatility of alkalies in finely-ground argillaceous minerals are reported. A method used to determine the sintering points of these minerals is described. In addition to six pure minerals which were studied, argillaceous materials which are more typical of cement-plant raw feed components were studied. The conclusions of this report are: at 1000 exp 0 C, a combination of CaCO sub 3 and CaCl sub 2 additives enables volatilizion in one-half hour up to about 50% of the total alkali from high-alkali feldspars. However, much less alkali was lost from the typical cement plant raw materials under the same conditions; the atmosphere in which the experiment was conducted may have a significant effect on the results, especially if there is S present in the system. Absence of O can lead to decomposition ofnormally involatile alkali sulfates. Fe Cl sub 3 , may be lost from the sample. Losses are greatest in the absence of CaO and water vapor; sintering points of the pure minerals are above 1200 exp 0 C. Therefore, there is little danger of their sintering at 1000 exp 0 C, the presence of fluxing agents such as CaCl sub 2 may cause some sticking; and the use of vapor-phase compounds such as FeCl sub 3 and HCl is not an effective means of volatilizing alkalies under test conditions of (1000 exp 0 C for 30 minutes). (ERA citation 04:052007)

COO-5011-1 PC **A02**/MF **A01**
Portland Cement Association, Skokie, IL. Construction Technology Labs.
Sulfate Specifications as a Constraint to Gypsum Addition to Cement and Possible Replacement of Gypsum as an Additive. Quarterly Technical Progress Report, September--October--November 1978.
D. L. Kantro. Nov 78, 5p
Contract EW-78-C-02-5011

Preparation and acquisition of working materials occupied most of the time expended. Calorimetric studies have been initiated. (ERA citation 04:052008)

COO-5011-2 PC **A02**/MF **A01**
Portland Cement Association, Skokie, IL. Construction Technology Labs.
Sulfate Specifications as a Constraint to Gypsum Addition to Cement and Possible Replacement of Gypsum as an Additive. Quarterly Technical Progress Report, December 1978--January--February 1979.
D. L. Kantro. Feb 79, 8p
Contract EW-78-C-02-5011

The objectives of the contract project are to develop comprehensive data on: (1) potential alternatives to gypsum for controlling set in commercial concretes; (2) additives to deter sulfate-induced expansion; and (3) the influence of clinker manufacturer on expansion potential in cements. This data will provide a basis for reconsidering the limitations currently imposed on sulfate contents in cements for reasons of soundness. (ERA citation 04:052009)

13D. Containers and Packaging

LA-7904-MS PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Calibration of a Rapid Quench Vessel.
R. W. Charles, and R. J. Vidale. Jul 79, 24p
Contract W-7405-ENG-36

A rapid quench vessel of new design has been calibrated at elevated temperature and pressure with a water pressure medium. Calibrations were done over 6.8 cm of the bottom of the vessel at angles of inclination (hot end, measured from the horizontal) of -10 exp 0 , -5 exp 0 , -2.5 exp 0 , 0 exp 0 , 2.5 exp 0 , 5 exp 0 , and 10 exp 0 at temperatures of 300, 450, 600, and 750 exp 0 C and 2 kbar = P/sub tot/. Results show a water pressure medium is satisfactory at all temperatures if the angle of inclination is +5 exp 0 or +10 exp 0 . A similar set of measurements were performed on a standard rod vessel. These results show the rod vessel to be essentially inclination independent. (ERA citation 04:052068)

PATENT-3 123 418 Not available NTIS
National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
Chassis Unit Insert Tightening-Extract Device. Patent,
L. W. Haerther, and P. A. Zimmerman. Filed 3 Oct 62, patented 3 Mar 64, 5p N79-33467/8, PAT-APPL-228 049
Supersedes PAT-APPL-228 049-62. Subm-Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

The invention relates to the insertion and extraction of rack mounted electronic units and in particular to a screw thread insert tightening and extract device, for chassis units having a collar which may be rotatably positioned manually for the insert tightening or extraction of various associated chassis units, as desired.

13E. Couplings, Fittings, Fasteners, and Joints

AD-A076 197/3 PC **A06**/MF **A01**
Air Force Materials Lab Wright-Patterson AFB Oh
US/Australia Collaborative Research Project on Corrosion Fatigue in D6AC Steel Joints.
Final rept. Jan 74-Aug 78,
C. L. Harmsworth , D. S. Kemsley , and J. M. Finney. Dec 78, 112p Rept nos. AFML-TR-78-150, ARL/STRUC-370/MAT-108

A U.S./Australian Program has been conducted to determine the effect of manufacturing-induced and environmental corrosion on D6AC steel Taper-Lok bolted joints as used in the F-111 aircraft. Under constant amplitude, traces of distilled water or concentrated hydrochloric acid in the bolt holes did not reduce fatigue life. Under spectrum loading traces of water did not affect fatigue life but traces of hydrochloric acid reduced the mean fatigue life of the joint by a factor of 110. The results of further constant amplitude tests and a limited series of spectrum tests confirmed previous findings that the life of those original joints in the F-111 which were manufactured using a six-flute hand reamer could be appreciably extended by rework with an 18-flute tapered reamer as used in later F-111 production. Other rework procedures involving cold working of the hole by a mandrel or specially designed fasteners showed little improvement when used in this relatively high-strength steel joint material. The effects of improved sealants and the capability of ultrasonic and magnetic NDI techniques for inspection of cracks at fastener holes were also investigated. It is concluded that the life of uncontaminated, properly fabricated and sealed D6AC steel joints as used in the F-111 wing carry through should not be a source of fatigue failure during a normal aircraft lifetime. (Author)

CONF-790730-2 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Fractographic Study of a Thick Wall Pressure Vessel Failure.
D. A. Canonico, R. S. Crouse, and T. J. Henson. 1979, 20p
Contract W-7405-ENG-26
International Metallographic Society conference, Tamiment, PA, USA, 8 Jul 1979.

The pressure vessel described in this paper is identified as Intermediate Test Vessel 1 (ITV-1)

and was fabricated of SA508, Class 2 Steel. It was tested to failure at 54 exp 0 C (130 exp 0 F). The gross failure appeared to be a brittle fracture although accompanied by a measured strain of 0.9%. Seven regions of the fracture were examined in detail and the observed surfaces were compared to Charpy V-notch (C/sub v/) specimens of SA508, Class 2 steel broken at temperatures above and below the ductile to brittle transition temperature. Three samples from the vessel were taken in the region around the fatigue notch and four from areas well removed from the notch. All these were carefully examined both optically and by scanning electron microscopy (SEM). It was established that early crack extension was by ductile mode until a large flaw approximately 500 mm long 83 mm wide was developed. At this point the vessel could no longer contain the internal pressure and final rupture was by brittle fracture. (ERA citation 04:050315)

CONF-790736-1 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Elevated Temperature Exposure Has Significant Effects on the Structure of Austenitic Stainless Steel Welds.
D. P. Edmonds, and R. J. Gray. 1979, 10p
Contract W-7405-ENG-26
International Metallographic Society conference, Montreal, Canada, 16 Jul 1979.

In order to minimize hot-cracking in austenitic stainless steel weld metals, the chemical compositions are generally adjusted to produce small amounts of delta-ferrite in the microstructure. Levels of ferrite in the range of 2 to 15 FN are acceptable for welds in these materials. An investigation of effects of aging and testing at 593 exp 0 C on the structures of type 308 stainless steel weld metals were investigated. Shielded metal-arc (SMA) welds were made with electrodes formulated by a commercial manufacturer to produce four different concentration levels of delta-ferrite. By varying the chromium-to-nickel concentration ratios (within the type 308 limits) in the deposits, weld metals with nominally 2, 5, 10, and 15 FN were produced. Specimens from these materials were aged and creep tested in air at 593 exp 0 C for times up to 36 Ms. Aged specimens were Charpy impact tested at room temperature. Both creep and impact-tested specimens were then examined metallographically (ERA citation 04:051925)

PB80-104359 Not available NTIS
National Bureau of Standards, Washington, DC.
Fitness for Purpose Evaluation of Defects in Pipeline Girthwelds.
Final rept.,
H. I. McHenry. 1979, 6p
Pub. in Proceedings of the Structural Integrity Technology Conference Held at Washington, DC. on May 9-11, 1979, p39-44 1979.

Fracture-mechanics principles are used to calculate allowable-flaw-size curves according to guidelines set by OPSO. All flaws are considered to be surface cracks. Initially, the curves are calculated by determining the largest flaw that would not grow through the pipe thickness during thirty years of worst-case operation. The curves are then modified by incorporating safety factors contained in the OPSO documents. This procedure defines accept and reject regions on a flaw-length versus flaw-depth plot. Curves defining these regions are developed using four distinct elastic-plastic fracture-mechanics methods: a critical crack-opening-displacement model, the Draft British Standard method, a plastic-instability model, and a semi-empirical model. Maximum stress, worst-case fatigue, a minimum toughness are assumed in all models. Separate sets of curves are developed for planar flaws, for non-planar flaws, and for arc burns.

13F. Ground Transportation Equipment

AD-A075 732/8 PC **A02**/MF **A01**
Army Test and Evaluation Command Aberdeen Proving Ground Md
Field Shock and Vibration Test of Vehicles.
Final rept. on test operations procedure,
26 Sep 79, 13p Rept no. TOP-2-2-808
Supersedes rept. no. MTP-2-2-808, dated 28 Aug 68, AD-718 030.

A method is provided for evaluating shock and vibration characteristics of vehicles during operation over selected test courses. Describes procedures for measuring structural response and response of components, equipment, cargo, and personnel positions. Describes instrumentation and courses, and provides guidelines for determining points at which three standardized levels of human exposure are reached. Applicable to wheeled and tracked vehicles. (Author)

AD-A076 003/3 PC **A07**/MF **A01**
Midwest Research Inst Kansas City Mo
A Bibliographic Survey of Automobile and Aircraft Wheel Shimmy.
Technical rept.,
Max Dengler , Martin Goland , and Georg Herrman. Dec 51, 149p WADC-TR-52-141
Contract AF 33(038)-21994

A literature survey, including 314 references, is presented for the fields of automobile and airplane wheel shimmy. The coverage is believed to be relatively complete insofar as the available, published world-wide literature is concerned. In addition to the bibliographic listings, a short review and appraisal of the contents of each reference is given. The report contains indices according to subject, author and nationality of the contributions; the periodical coverage of the survey is also given in detail. A general survey of the problems of automobile and airplane wheel shimmy is included, which highlights the principal trends and contributions to the subject over the years. Finally, on the basis of the survey indications, recommendations are advanced for further research and development in the field. (Author)

COO-4867-03 PC **A02**/MF **A01**
Department of Energy, Pittsburgh, PA. Pittsburgh Energy Technology Center.
Gas Turbines Engines and Transmissions for Bus Demonstration Programs.
D. N. Nigro. Apr 79, 6p
Contract EM-78-C-02-4867

The report covers the period from 31 January 1979 through 30 April 1979 and is a summary of DDA activities for the effort performed on the procurement of eleven (11) Allison GT 404-4 gas turbine engines and five (5) HT740CT and six (6) V730CT Allison automatic transmissions and the required associated software. (ERA citation 04:051886)

DOE/JPL/152170-T1 PC **A05**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Aerodynamic Characteristics of Sixteen Electric, Hybrid, and Subcompact Vehicles. Complete Data.
D. W. Kurtz. Jun 79, 95p JPL-PUB-79-59
Contract NAS-7-100-152170

The report presents an elementary electric and hybrid vehicle aerodynamic data base and describes how it was developed. Sixteen electric, hybrid, and subcompact production vehicles were tested in the Lockheed-Georgia low-speed wind tunnel. Zero-yaw drag coefficients ranged from a high of 0.58 for a boxey delivery van and an open roadster to a low of about 0.34 for a current four-passenger prototype automobile which was designed with aerodynamics as an integrated parameter. Vehicles were tested at yaw angles up to 40 degrees and a wind weighting analysis is presented which yields a vehicle's effective drag coefficient as a function of wind velocity and driving cycle. Other parameters investigated included the effects of windows open and closed, radiators open and sealed, and pop-up headlights. Complete six-component force and moment data are presented in both tabular and graphical formats. Only limited commentary is offered since, by its very nature, a data base should consist of unrefined reference material. A justification for pursuing efficient aerodynamic design of EHVs is presented which demonstrates the partitioning of the road energy requirement and the dependence of range upon the aerodynamic drag component over an electric vehicle driving cycle. Establishing this data base is one required element of a larger task, the purpose of which is to develop an aerodynamic design guide for use by the EHV industry. (ERA citation 04:053417)

DOE/NASA/0032-79/1 PC **A03**/MF **A01**
Mechanical Technology, Inc., Latham, NY.
Conceptual Design Study of an Automotive Stirling Reference Engine System.
Jun 79, 31p NASA-CR-159605
Contract EC-77-A-31-1040

An early task under the contract requires the contractor to prepare a series of conceptual Stirling engine system designs intended to meet the final program objectives, and to submit the initial conceptual designs, supporting analyses and recommendations to the NASA Project Manager for review and approval. The recommended Stirling engine concept should be the one which has the greatest chance of successfully meeting the final program objectives, within the capabilities, schedule and budget of the Program. The report summarizes the studies that were made, the methodology that was used and the results which support the concluded recommendation of a: Four cylinder, double acting, and square U design, with external regenerators. Optimization of this design concept resulted in a calculated fuel economy of 36.3 mpg for a 3200 pound vehicle, compared to the program goal of 30.0 mpg., and acceleration time of 13.1 seconds compared to the program goal of 15.0 seconds. The engine will meet or exceed the program emission goals of HC $<$ 0.41 gram/mile, CO $<$ 3.4 gram/mile, and NO/sub x/ $<$ 0.4 gram/mile. (ERA citation 04:051887)

NTISUB/E/281-016 PC **E03**/MF **A01**
Central Intelligence Agency, Washington, DC.
USSR: Role of Foreign Technology in the Development of the Motor Vehicle Industry.
Research paper.
Oct 79, 35p ER-79/10571
Color illustrations reproduced in black and white. Paper copy available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers an approximate 20% reduction in price as a Standing Order.

The paper considers the contributions of domestic and foreign technology to the development of the Soviet motor vehicle industry and assesses the relative importance of domestic contributions compared with foreign. It examines the history of the development of the Soviet automotive industry and identifies when major changes in the technological level of the industry occurred. The peculiarities of the Soviet environment are considered in order to show why Soviet technology is different in some respects from Western technology. Finally the study, examines and explains present Soviet reliance on foreign automotive technology, with particular attention given to the examples of diesel engines and automotive production equipment.

PB80-106289 PC **A17**/MF **A01**
Systems Technology, Inc., Hawthorne, CA.
Reduction of Adverse Aerodynamic Effects of Large Trucks. Volume I: Technical Report.
Interim rept. Nov 76-Sep 78,
David H. Weir, Jay F. Strange, and Robert K. Heffley. Sep 78, 380p TR-1093-1, FHWA/RD-79/84
Contract DOT-FH-11-9165

The overall objective of this study has been to develop methods of minimizing three aerodynamic-related phenomena: truck-induced aerodynamic disturbances, splash, and spray. An analytical methodology has been developed and used to characterize aerodynamic flow, truck splash and spray generation and propagation, adjacent driver visibility factors, the performance of the disturbed adjacent driver/vehicle system, and benefit/cost comparisons. These same factors have been studied in a series of driving simulator, wind tunnel, and full scale tests and experiments. Attention in the experiments and analyses has focused on understanding the phenomena, as well as on identifying and developing devices, techniques, and procedures for minimizing these aerodynamic effects. Several truck mounted devices and prototype concepts are identified which have the potential to alleviate the adverse effects of splash and spray in a cost-effective way. These include collector flaps, simple fenders, and aerodynamic panels and devices near the tractor, under the truck, and around the wheels. Non-vehicle means of alleviation are considered, as well.

PB80-106636 PC **A02**/MF **A01**
Nevada Automotive Test Center, Carson City.
NDT (Non-Destructive Test)/Road Correlation. Summary Report.
Final rept.,
Henry C. Hodges, and Henry C. Hodges, Jr. 18 Apr 79, 19p DOT-HS-805 034
Contract DOT-HS-7-01589

The purpose of this study was to obtain an additional data base to determine the potential applications of NDT water-coupled ultrasonics. Several NDT methods were compared and water-coupled ultrasonics produced the most accurate and repeatable data for three-dimensionally positioning tire anomalies. For the continuation of the evaluation of water-coupled ultrasonics 75 recapped test tires were obtained, including bias, bias-belted and radial, and scheduled for 10,000 miles of highway durability. The tires, in general, only obtained one-third that mileage due to catastrophic failures and treadwear anomalies. These tires were NDT-inspected prior to test and after test to analyze the ability of water-coupled ultrasonics to differentiate between those tire anomalies which lead to degraded road performance and those which do not. Tires were cut at the end of test to verify the NDT results. The results showed that water-coupled ultrasonics can determine anomalies; however, the effectiveness of the device depends on the experience of the data analyst. Refinement of water-coupled ultrasonics NDT under this study has vastly improved the viability of the system. However, application will be limited until a data base is obtained such that anomalies can be appropriately identified.

PB80-106693 PC **A03**/MF **A01**
National Transportation Safety Board, Washington, DC. Bureau of Accident Investigation.
Marine Accident Report: Spanish Motor Tankship RIBAFORADA Ramming of Barge MB-5, Three Wharves, and Cargo Ship M/V TIARET, New Orleans, Louisiana, December 4, 1977.
Marine accident rept.
21 Sep 79, 27p NTSB-MAR-79-15

At 0750 c.s.t., on December 4, 1977, the Spanish motor tankship RIBAFORADA rammed the moored barge MN-5, three wharves, and the cargo ship M/V TIARET on the lower Mississippi River near New Orleans, Louisiana. Two of the RIBAFORADA's cargo tanks were breached. Property damage was estimated to be $921,000. The National Transportation Safety Board determines that the probable cause of the accident was the pilot's late initiation of the turning maneuver and the failure of the master to more insistently assert his concern or to assume control of the vessel when the RIBAFORADA was too close to the left descending bank. Contributing to the cause were the pilot's limited familiarity with the maneuvering characteristics of the RIBAFORADA, and the pilot's impaired attentiveness due to fatigue.

PB80-108145 PC **A03**/MF **A01**
Systems Technology, Inc., Hawthorne, CA.
Development of Aerodynamic Disturbance Test Procedures. Volume I: Executive Summary.
Final rept. 30 Sep 77-30 Mar 79,
Richard H. Klein, and Jeffrey R. Hogue. Aug 79, 33p STI-TR-1117-1-I, DOT-HS-805 078
Contract DOT-HS-7-01716

Research described in this report was conducted using the first full scale crosswind disturbance test facility in the United States. This facility is capable of providing a 35 mph crosswind for a nominal 120 ft test length. The crosswind responses of twenty different vehicles were surveyed. These vehicles included 8 conventional cars (plus 4 trailers), 2 station wagons, 3 light trucks (one with camper), 3 vans, and 4 two-wheelers (including a moped and bicycle). Complete instrumented vehicle tests were conducted on five vehicles: Honda Accord, Chevrolet station wagon (alone and with trailer), Ford Econoline van, VW Microbus, and Ford pickup/camper. Three test procedures were used in three different crosswind disturbance configurations. These were steering fixed, steering free, and driver control of lane position. The crosswind configurations were straight pulse, doublet pulse, and a shaped profile. Results showed that passenger cars, station wagons, trucks, and most vans have virtually no crosswind sensitivity problems, whereas the VW Microbus, the pickup/camper (in winds higher than 35 mph), cars pulling trailers, and mopeds do have potential problems.

UCRL-Trans-11482 PC **A02**/MF **A01**
Bundesministerium fuer Forschung und Technologie, Bonn-Bad Godesberg (Germany, F.R.).
Hydro Bus: Development of a Prototype with Optimized Hybrid Propulsion.
Apr 79, 17p
Contract W-7405-ENG-48
A Nahverkehrsforschung '78 (research on short-distance traffic 1978), pp 225-231.

The conceptional design for a city bus powered by a diesel engine and equipped with hydraulic accumulators is presented. Projected performance and fuel consumption for the bus are discussed. (ERA citation 04:051891)

13G. Hydraulic and Pneumatic Equipment

AD-A075 996/9 PC **A02**/MF **A01**
Wright Air Development Center Wright-Patterson AFB Oh
XB-46 Aircraft, Serial number 45-59582, Pneumatic System and Components Tests and Inspection.
Technical rept.,
Ralph L. Vich. Mar 52, 20p Rept no. WADC-TR-52-44

Low temperature operational difficulties in the XB-46 pneumatic system and malfunctioning of the system components due to corrosion made necessary the tests reported herein. Cold temperature functioning tests were conducted at the Air Proving Ground and the conclusions and recommendations are contained in this report. Gunfire tests, to determine the vulnerability of the air storage containers, and corrosion inspection were conducted by the Aircraft Laboratory at the Wright Air Development Center and the results indicated that the use of tubular structural members as air storage containers is desirable, and components designed for pneumatic systems, along with dehydrators, will reduce the corrosion and freezing of accumulated moisture problems, to allow satisfactory operation of the system. (Author)

AD-A075 998/5 PC **A04**/MF **A01**
Wright Air Development Center Wright-Patterson AFB Oh
Waterman Type I Hydraulic Quantity Measuring Fuse.
Technical rept.,
Howard R. Davies. Mar 52, 61p Rept no. WADC-TR-52-52
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

A series of hydraulic quantity measuring fuses, Type I, manufactured by the Waterman Engineering Company were subjected to qualification tests in accordance with the applicable specifications. The temperature range investigated was -65 F to +160 F with a fluid flow rate range of 0.1 gpm to 12 gpm. The fluid used was in accordance with Specfication MIL-0-5606. It is concluded that the units tested were acceptable for use in aircraft hydraulic systems, containing the above mentioned fluid. (Author)

AD-A076 059/5 PC **A08**/MF **A01**
North American Aviation Inc Los Angeles Calif
Investigation of Pressure Surges in Aircraft Hydraulic Systems.
Technical rept.,
E. A. Housel. Mar 52, 173p WADC-TR-52-37
Contract AF 33(038)-18983

Theoretical and experimental studies were made to determine the effects of numerous system and component parameters on the magnitude and frequency of pressure surges which occur upon opening or closing a valve in a hydraulic system. It was found necessary to consider the system as a composite unit, due to the complex manner in which the effective resistances, inductances, and capacitances of the system components affected surge characteristics. Electric analogs have been proposed as a convenient means for system analysis, and theoretical approaches for their practical application have been developed. Analytical studies of existing and experimental data were made to determine the effect of pressure surges on the fatigue characteristics of various hydraulic system components. These studies indicated the magnitude of the surge to be of primary concern, with frequency and rate of pressure rise showing only secondary effects. Secondary high-frequency oscillations were found particularly undesirable because of their excessive peaks, but certain information pertinent to their control has been obtained. (Author)

13H. Industrial Processes

AD-A075 632/0 Not available NTIS
Australian Defence Scientific Service Melbourne
Metal Cutting from a Materials Viewpoint,
E. D. Doyle , and L. E. Samuels. Nov 75, 14p
Availability: Pub. in the Jnl. of the Australian Institute of Metals, v21 n1 p2-15 Mar 76 (No copies furnished by DTIC).

No abstract available.

AD-A075 669/2 Not available NTIS
Australian Defence Scientific Service Melbourne
Factors Affecting Workpiece Deformation during Grinding,
D. M. Turley , and E. D. Doyle. 25 Sep 75, 11p
Availability: Pub. in Materials Science and Engineering, v21 p261-271 1975 (No copies furnished by DTIC).

No abstract available.

AD-A075 671/8 Not available NTIS
Materials Research Labs Ascot Vale (Australia)
Effect of Axial Forces on Dimensional Accuracy during Tapping,
E. D. Doyle , and S. K. Dean. 24 May 73, 10p
Availability: Pub. in International Jnl. of Machine Tool Design and Research, v14 p325-333 1974 (No copies furnished by DTIC).

No abstract available.

AD-A075 744/3 PC **A03**/MF **A01**
Naval Surface Weapons Center Dahlgren Lab Va
Ultrasonic C-Scan Testing of Mk 38 Missile Warhead Weldments.
Final rept.,
C. W. Anderson. Jul 79, 34p Rept no. NSWC/TR-79-266

The nondestructive determination of weld fusion for Mk 38 Sparrow missile warhead casing weldments is discussed. The use of an ultrasonic C-scan technique is described, and the results are compared with destructive testing. Limitations imposed by geometric and dimensional tolerance considerations are also presented. The C-scan technique provides an accurate mapping of lack of fusion within the forward weld root and the aft weld sidewalls. The task is part of a larger effort to correlate weld geometry with weld strength to determine minimum weld requirements. (Author)

AD-A075 889/6 PC **A03**/MF **A01**
Illinois Univ At Urbana-Champaign Engineering Experiment Station
A Study in Bonding: Metal to Glass to Ceramics.
Technical rept.,
William F. Zimmerman , W. J. Plankenhorn , and Dwight G. Bennett. Mar 52, 33p 60, WADC-TR-52-86
Contract W-33-038-ac-14520

Ceramic tile pieces approximately 1 in. thick and either 1/4 in., 1/2 in., or 1 in. square were prepared from a high alumina porcelain, a zircon porcelain and a cordierite body. These ceramic specimens were fired in contact with the porcelain enameled surface of low carbon sheet steel approximately 0.52 in. thick. An enamel of low softening point (900 F.) and two series of graded expansion laminated coatings were used as the bonding medium in an effort to reduce shear stresses caused by the differential contraction of metal and ceramic. Smaller tile size, greater body porosity and retard-

ed cooling rate seemed to aid in the development of a bond. Although it was possible to firmly attach the alumina, zircon and cordierite bodies to metal under favorable conditions, an extremely high stress level was generally indicated. (Author)

AD-A076 173/4 PC **A03**/MF **A01**
Army Armament Research and Development Command Watervliet Ny Large Caliber Weapon Systems Lab
Application of Electron Beam Welding to Heavy Components.
Memorandum rept.,
V. Colangelo. Jun 79, 31p Rept no. ARLCB-MR-79014

The current investigation evaluates the mechanical properties and weld soundness of an electron beam welded casting which was substituted for a complex forging. The mechanical properties obtained were adequate, however, radiographic studies indicated considerable porosity in the welds which was not tolerable. This porosity was the result of the agglomeration of porosity on forged specimens of the same alloy and configuration. The study showed that weldments made from forged sub-sections could meet the mechanical property and soundness requirements.

AD-A076 237/7 PC **A05**/MF **A01**
RCA Labs Princeton Nj
High-Energy Ion Implantation for Multigigabit-Rate GaAs Integrated Circuit.
Annual rept. 15 May 78-14 May 79,
S. G. Liu , E. C. Douglas , and C. P. Wu. Aug 79, 79p Rept no. PRRL-79-CR-37
Contract N00014-78-C-0367

The program objectives are: study of high-energy (about 1 MeV) ion implantation of donors into GaAs for multigigabit-rate integrated-circuit development and annealing of implanted GaAs using high-power lasers to remove lattice damage and activate implanted donors. Results obtained are: We have investigated implantation of 28Si(+) into semi-insulating GaAs with implant energies ranging from 40 keV to 1.2 MeV; we have analyzed the profiles and range statistics of 28Si-implanted GaAs with energies of up to 1.2 MeV using (Secondary Ion-Mass Spectroscopy) SIMS; we have investigated laser-annealing of high-dose Si-implanted GaAs using both a high-power Nd:glass laser and a ruby laser; optical absorption in Si-implanted GaAs wafers irradiated with high-power Nd:glass laser pulses has been studied; impurity distribution in as-implanted, thermally annealed, and laser-annealed samples has been investigated by SIMS; and investigation of 28Si(+) implantations in GaAs at the low-implant energy (<300 keV) shows that the electron concentration attained has an upper limit at the high-dose region and a lower limit at the low-dose region following thermal annealing.

AD-A076 261/7 PC **A03**/MF **A01**
Battelle Memorial Inst Columbus Ohio Columbus Labs
Determination of the Feasibility of Shielded-Metal-Arc Welding and Oxygen-Arc Cutting at a Depth of 600 Feet to The United States Navy.
Research rept.,
F. A. DeSaw , D. W. Caudy , H. W. Mishler , and M. D. Randall. 31 Jul 69, 33p
Contract N00014-66-C-0199

Underwater arc welding and oxygen-arc cutting have been used in salvage and repair operations for many years. These processes have been used, however, only at shallow depths, typically less than 100 feet. Before extending the use of arc welding and cutting to significantly greater depths, the feasibility of these processes at the greater depths must be known and potential problem areas must be identified.

AD-A076 333/4 PC **A07**/MF **A01**
Army Industrial Base Engineering Activity Rock Island Il
Survey of Computer Aided Manufacturing Systems within DARCOM. First CY 79.
Biannual survey 21 Jun 77-31 Jul 79,
Albert C. Adifinger. Sep 79, 149p

This document is the result of a survey of the CAM History, Active and Planned Efforts, and Projected CAM Needs within DARCOM. The information included in this survey was submitted to IBEA from DARCOM major subordinate commands, installations and activities. Summaries of active and completed CAM projects are included in two appendices. (Author)

DOE/TIC-10200 PC **A02**/MF **A01**
Westinghouse Electric Corp., Tampa, FL. Tampa Div.
(Development of Automated Welding Process for Field Fabrication of Thick Walled Pressure Vessels: Management Plan). Technical Progress Report for Period Ending March 31, 1979.
10 Apr 79, 12p
Contract EF-78-C-01-2771

Activities accomplished during this period included reviews of gas metal-arc, gas tungsten-arc, submerged arc, and electron beam welding processes. The prototype torch was designed and built and seam tracker probes were demonstrated. (ERA citation 04:051902)

N80-10598/4 PC **A03**/MF **A01**
Crystal Systems, Inc., Salem, Mass.
Silicon Ingot Casting Heat Exchanger Method, Multi-Wire Slicing, Fixed Abrasive Slicing Technique, Phase 3.
Quarterly Progress Report, 1 Apr. - 30 Jun. 1979.
F. Schmid, and C. P. Khattak. Jul 79, 34p NASA-CR-162398, DOE/JPL-954373-79/11
Contract JPL-954373
Subm-Sponsored by NASA and DOE Prepared for JPL.

Ingot casting was scaled up to 16 cm x 16 cm square cross section size weighting up to 8.1 kg. The high degree of crystallinity was maintained in the large ingot. For large sizes, the non-uniformity of heat treatment caused 'chipping' of the surface of the ingot. Significant effort and progress was made in the development of a uniform graded structure in the silica crucibles. The high speed slicer was modified so that the bladehead weight was reduced to 37 pounds. This allowed for higher surface speeds of up to 500 feet per minute. Slicing of 10 cm diameter workpieces at these speeds increased the throughput of the machine to 5.7 mils/min., 0.145 mm/min., 50 per cent more than the projected cutting rates used in the economic analysis.

PAT-APPL-6-037 210 PC **A02**/MF **A01**
Department of the Army Washington DC
Process and Composition of Low Toxicity for Preparing Aluminium Surfaces for Adhesive Bonding.
Patent Application,
William J. Russell, and Elizabeth A. Garnis. Filed 9 May 79, 23p AD-D006 400/6
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A principal object of the present invention is to provide a novel process and composition for etching aluminum, which utilizes neither chromate nor nitric acid and produces aluminum surfaces, which when adhesively bonded yield joints of comparable strength and stress durability to those obtained by use of either the standard chromate etch or the chromate-free nitric acid etch of the patent. Other objects will become apparent as the invention is further described. These and other objects are achieved according to the present invention by contacting the aluminum parts with an etchant composition consisting essentially of an aqueous solution of sulfuric acid and ferric sulfate.

13I. Machinery and Tools

EPRI-NP-1107 PC **A04**/MF **A01**
Sigma Research, Inc., Richland, WA.
Semiautomatic Weld Crown Contouring Equipment. Final Report.
Jun 79, 64p

Pipe welds in nuclear plants are presently finished by tedious hand grinding for ultrasonic testing. A study has now been completed demonstrating that a semiautomatic machine for finishing weld crowns is quite feasible. Such a machine could produce more consistent contours than hand finishing as well as improved surface finishes; also it could virtually eliminate inadvertent undercutting of the weld crown and the need for subsequent repair before testing. The machine could reduce the time required to finish the welds by a factor of 10 on Class-1 welds, saving $31 million for plants being built and $21 million for reactors being planned. To determine feasibility and develop the concept, specialists of 30 utilities were surveyed to establish practical performance requirements for the machine including pipe materials, size of pipes, space restrictions, typical misalignments, offsets and out of roundness. The conceptual design is an external lathe that clamps over and encircles the pipe. The lathe tool bit is driven around the pipe by an electric motor. The radial position of the tool bit is real-time controlled by an on-board microprocessor to produce the smoothest blend across the area of the joint between the two pipes. The microprocessor program is set by making initial circumferential scans on both sides of the weld with an electronic stylus in place of the tool bit. This provides the microprocessor with initial and final coordinates from which to compute the cut. To test the general concept of an external lathe, a test machine was fabricated and set up to remove a 308 stainless steel weld crown on a 10-inch-diameter Schedule 40 pipe. The machine easily finished the welded area producing a surface finish of better than 100microinches RMS in one pass while simultaneously removing a weld crown 0.150 inches thick. Tests of the microprocessor-controlled cutting head and development of a field prototype design are planned. (ERA citation 04:050541)

N80-10497/9 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Washington, D. C.
Algorithm for Constructing the Programmed Motion of a Bounding Vehicle for the Flight Phase.
V. V. Lapshin. Aug 79, 47p NASA-TM-75668, PREPRINT-26
Contract NASW-3199
Tran-Transl. Into English of "Algoritm Postroeniya Programmnogo Dvizheniya Prygayushchego Apparata Dlya Fazy Poleta', Prep. No. 26 Acad. Of Sci. Ussr, Inst. Of Appl. Math., Moscow, 1979 p 1-53. Subm-Transl. By Leo Kanner Associates, Redwood City, Calif.

The construction of the programmed motion of a multileg bounding vehicle in the flight was studied. An algorithm is given for solving the boundary value problem for constructing this programmed motion. If the motion is shown to be symmetrical, a simplified use of the algorithm can be applied. A method is proposed for nonimpact of the legs during lift-off of the vehicle, and for softness at touchdown. Tables are utilized to construct this programmed motion over a broad set of standard motion conditions.

PATENT-4 154 385 PC **A02**/MF **A01**
Department of the Navy Washington DC
Single Filament Fiber Optic Cable Parting Tool.
Patent,
Adolph L. Lewis. Filed 12 Dec 77, patented 15 May 79, 6p AD-D006 425/3, PAT-APPL-859 637 Supersedes PAT-APPL-859 637-77, AD-D004 663.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A hand-held, manually operative tool is designed for severing single filament, fiber optic cable. The exertion of a squeeze-like pressure on the handles of the tool cause the fiber optic cable to be gripped firmly and positioned on an anvil member where it may be scored by a sharpened hard element such as a diamond point, for example, at a selectively determined point along the axis of the fiber optic cable. Further actuation of the tool causes the gripping members to be pivoted away from each other thus parting the fiber optic cable at the selectively determined point. The coacting members of the tool are spring loaded for return to their normal unactuated state and the anvil member is preferably a curved surface so as to retain the fiber optic cable in a desired disposition during the scoring operation.

PB80-102569 PC **A08**/MF **A01**
Purdue Univ., Lafayette, IN. School of Industrial Engineering.

Optimal Planning of Computerized (Flexible) Manufacturing Systems.
Rept. no. 4,
R. J. Mayer, and J. J. Talavage. Nov 76, 152p
NSF/RA-761795
Grant NSF-APR74-15256

Described is the design and function of a simulation package to model the workings of Flexible Manufacturing Systems (FMS) currently in operation at the Caterpillar Tractor Company in Peoria, Illinois. FMS provide a capability to economically produce small to medium quantities of a wide variety of parts which demand exacting tolerances. In order to examine control logic and material flow, a simulation in GASP IV was developed, verified, and validated. An experiment is described to test alternatives to the current design of the factors found to be critical to overall system performance: (1) part movement policies; (2) location of temporary storage facilities; and (3) input of raw material. Response variables measured are the number of operations and the number of finished pieces per day. Results of the analysis show that the best part movement policy is one which allows the most freedom with respect to subsequent moves. The best temporary storage location is one which is balanced with respect to the traffic parts in the system. The best input policy is one which allows the stockpiling of a limited number of parts with shorter cycle time to allow for uninterrupted periods of work on the parts with the longer cycle time.

PB80-802515 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Journal Bearings (Citations from the NTIS Data Base).
Rept. for 1964-Nov 78,
Guy E. Habercom, Jr. Dec 79, 178p
Supersedes NTIS/PS-78/1279, NTIS/PS-77/1126, NTIS/PS-76/0974, and NTIS/PS-75/801. For the companion Published Searches of the Engineering Index Data Base, see NTIS/PS-77/1127 and PB80-802523.

Design and performance of journal bearings are discussed in these Government-sponsored research reports. Operation is diversified environments such as liquid metals and gases is investigated. (This updated bibliography contains 172 abstracts, 5 of which are new entries to the previous edition.)

PB80-802523 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Journal Bearings. Volume 2. November, 1976-November, 1979 (Citations from the Engineering Index Data Base).
Rept. for Nov 76-Nov 79,
Guy E. Habercom, Jr. Dec 79, 175p
Supersedes NTIS/PS-78/1280, NTIS/PS-77/1128, and NTIS/PS-76/0975. For the companion Published Search of the NTIS Data Base, see PB80-802515. See also Volume 1, 1970-October, 1976, NTIS/PS-77/1127.

Design and performance of journal bearings are discussed in these reports gathered from a worldwide literature survey. Lubrication, hydrodynamics, and thermodynamics of various geometric configurations are reviewed. (This updated bibliography contains 169 abstracts, 42 of which are new entries to the previous edition.)

PB80-802606 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Liquid Bearings (Citations from the NTIS Data Base).
Rept. for 1964-Nov 79,
Guy E. Habercom, Jr. Dec 79, 101p
Supersedes NTIS/PS-78/1281, NTIS/PS-77/1124, NTIS/PS-76/0972, and NTIS/PS-75/804. For the companion Published Search of the Engineering Index Data Base, see PB80-802614.

Design and performance of hydrostatic and hydrodynamic bearings are investigated in these Government-sponsored research reports. Wear resistance, lubrication effectiveness, and performance in liquid environments are among the parameters reviewed. Cryogenic and liquid metal environments are included. (This updated bibliography contains 94 abstracts, none of which is a new entry to the previous edition.)

PB80-802614 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Liquid Bearings (Citations from the Engineering Index Data Base).
Rept. for 1970-Nov 79,
Guy E. Habercom, Jr. Dec 79, 149p
Supersedes NTIS/PS-78/1282, NTIS/PS-77/1125, and NTIS/PS-76/0973. For the companion Published Search of the NTIS Data Base, see PB80-802606.

Design and performance of hydrostatic and hydrodynamic bearings are investigated in these reports gathered in a worldwide literature survey. Wear resistance, lubrication effectiveness, and performance in cryogenic and liquid metal environments are among the parameters reviewed. (This updated bibliography contains 142 abstracts, 8 of which are new entries to the previous edition.)

SAND-79-0364C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Design and Use of Polycrystalline Diamond Compact Drag Bits in the Geothermal Environment.
S. G. Varnado, C. F. Huff, and P. Yarrington.
1979, 9p CONF-790913-3
Contract EY-76-C-04-0789
54. annual technical conference and exhibition, Las Vegas, NV, USA, 23 Sep 1979.

The potential for utilizing polycrystalline diamond compact (PDC) cutters to provide high performance bits has been recognized by the drilling industry. New bit designs suitable for geothermal drilling are being developed based on the results of single cutter laboratory tests and analytical analyses. A new bonding technique for attaching the cutters to the bit body has been developed. Bits using this new technique have been built and tested with promising results. The results of single cutter tests, the bit design philosophy, the bonding process for attaching the cutters to the bit body, and the results of laboratory and field tests of these new bit designs are described. (ERA citation 04:051386)

UCRL-15045 PC **A05**/MF **A01**
General Electric Corporate Research and Development, Schenectady, NY.
Application of Inertia Welding Technology to Steel Disc-Type Flywheels. Final Report.
29 Jun 79, 80p
Contract W-7405-ENG-48

The program was established to investigate the feasibility of applying inertia welding to the fabrication of steel flywheel assemblies for transportation application. In the inertia welding process, the weld is accomplished by friction and pressure. The parts are literally spun together. The inertia welding characteristics of three steel alloys (Hy-Tuf, 4340, and D6AC) were determined by welding both solid bars (1-in. OD) and tubular specimens (2-in. OD by 0.1-in.-thick wall). In addition, characteristics of the weld and the weld flash (that material extruded from the weld mating surfaces during the welding process) were evaluated. Results indicated Hy-Tuf and 4340 have good welding characteristics, while D6AC is questionable. (ERA citation 04:051892)

13J. Marine Engineering

AD-A075 690/8 PC **A03**/MF **A01**
David W Taylor Naval Ship Research and Development Center Bethesda Md Ship Performance Dept
Waterjet Propulsor Performance Prediction in Planing Craft Applications.
Final rept.,
Stephen B. Denny , and Allan R. Feller. Aug 79, 42p Rept no. DTNSRDC/SPD-0905-01

A performance prediction technique is presented for flush inlet waterjet systems installed on planing craft. The equations were derived based on empirical data and physical reasoning. This technique may be used to find an optimum waterjet configuration for a given planing craft, based on desired propulsive efficiency, weight, power, craft speed, waterjet size or any combination of these parameters. The useful domain of this technique is bound by the data base used in the derivation, which is a collection of commercially available waterjets. Radically new waterjet configurations would require an update of the equations based on empirical data. Experimental and analytical work is recommended for the predictions of flush inlet head recovery and of pump cavitation characteristics. New data would improve the accuracy of the current mathematical model. (Author)

AD-A075 854/0 PC **A04**/MF **A01**
Swedish State Shipbuilding Experimental Tank Goteborg
Supercavitating Propeller Performance. Influence of Propeller Geometry and Interaction BETWEEN Propeller, Rudder and Hull,
Olle Rutgersson. 1978, 59p
Summary in French.

No abstract available.

AD-A076 066/0 PC **A05**/MF **A01**
Transportation Systems Center Cambridge Ma
Vessel Traffic Service Watchstander Performance in Routine Operations.
Final rept. Apr 77-Sep 78,
D. B. Devoe , C. N. Abernethy , J. W. Royal , K. J. Kearns , and R. A. Rudich. Oct 79, 85p TSC-USCG-79-5, USCG-D-44-79

Human factors specialists observed and measured the performance of watchstanders at four Vessel Traffic Service (VTS) centers: Houston-Galveston, Puget Sound, New Orleans, and San Francisco. Analysis of the data yielded results amenable to mathematical modeling for generalized evaluation and prediction of VTS watchstander performance. The report discusses implications of the data for the design and use of equipment (including computers), communications facilities, operational procedures, and personnel selection and training methods. Fourteen recommendations are offered for consideration in the operation of current VTS's and the plannning of future systems. (Author)

AD-A076 193/2 PC **A05**/MF **A01**
David W Taylor Naval Ship Research and Development Center Bethesda Md Ship Performance Dept
ASR-14 Ship and Tow Point Motion Predictions.
Final rept.,
T. R. Applebee , and A. E. Baitis. Apr 79, 80p
Rept no. DTNSRDC/SPD-0895-01

Surge and longitudinal displacement at a cable tow position are predicted for a Submarine Rescue Ship (ASR) in long- and short-crested seas. Results are presented in the form of speed polars, but interpretation must be approached with caution in light of highly restrictive assumptions. (Author)

AD-A076 309/4 PC **A03**/MF **A01**
Coast Guard Research and Development Center Groton Ct
Buoy Reference Library.
Final rept.,
M. Grossetti , K. Prime , M. Campbell , and E. J. Moukawsher. Mar 78, 34p CGR/DC-6/78, USCG-D-50-78

Navigational buoys have been used in the United States since 1767 to warn mariners of impending dangers. It is rather odd, therefore, that some 200 years later there is no collection of material in one place that might shed some light upon buoy technology. Undoubtedly, the state-of-the-art is much more sophisticated, and it is the intention of this paper to present a buoy reference library. The library consists of all known books and unclassified papers that were possible to obtain in a four-week period. The subjects of both fixed and floating breakwaters were included in the searches for written material, but not in as much detail as buoys. Along with this reference material, a list of buoy manufacturers is included. The amount of papers and books written will multiply, but for the present, this is the only known working buoy reference library in existence. The subject is broken down into seven categories alphabetically filed. These are (1) mooring systems, (2) power sources, (3) development and design, (4) applications and uses, (5)

instrumentation, math and computer models, (6) characteristics, and (7) miscellaneous. Two additional categories were made for fixed and floating breakwaters. (Author)

PB80-801517 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Icebreakers and Icebreaking (Citations from the NTIS Data Base).
Rept. for 1964-Nov 79,
Guy E. Habercom, Jr. Dec 79, 232p
Supersedes NTIS/PS-78/1259, NTIS/PS-77/1139, NTIS/PS-76/1049, NTIS/PS-75/077. For the companion Published Search of the Engineering Index Data Base, see PB80-801525.

The design and performance of icebreakers, ice breaking, ice navigation, and ice distribution are reviewed in these Government-sponsored research reports. (This updated bibliography contains 224 abstracts, 11 of which are new entries to the previous edition.)

PB80-801525 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Icebreakers and Icebreaking (Citations from the Engineering Index Data Base).
Rept. for 1970-Nov 79,
Guy E. Habercom, Jr. Dec 79, 81p
Supersedes NTIS/PS-78/1260, NTIS/PS-77/1140 and NTIS/PS-76/1050. For the companion Published Search of the NTIS Data Base, see PB80-801517.

The design and performance of icebreakers, ice breaking, ice navigation, and ice distribution are reviewed in these reports gathered in a worldwide literature survey. (This updated bibliography contains 75 abstracts, 9 of which are new entries to the previous edition.)

13K. Pumps, Filters, Pipes, Fittings, Tubing and Valves

EPRI-AF-853 PC **A10**/MF **A01**
Rockwell International, Canoga Park, CA. Rocketdyne Div.
Coal Slurry Feed Pump for Coal Liquefaction. Final Report.
G. S. Wong. Sep 78, 203p

A study to determine the feasibility of a high-volume, high-pressure, centrifugal coal slurry feed pump for coal liquefaction was conducted. The pumping requirements for the feed pump were: 5000 gpm at 3000 psi and 550 exp 0 F. The study consisted of three tasks, and the results obtained are described. Task I was an engineering study to define the material erosion problems in centrifugal pumps and to select for experimental evaluation promising metals, hardfacings, coatings, and inserts capable of withstanding coal-oil slurries at high temperatures and pressures. Task II consisted of experimental testing of selected candidate materials with coal-oil slurries at Battelle Columbus Laboratories and the Wilsonville, Alabama, solvent-refined-coal (SRC) pilot plant facilities. Task III was a conceptual design study of candidate centrifugal pump concepts in various configurations, such as: single-shaft, split-shaft, stage modules or, stage stacking. An engineering evaluation of the pump concepts and their application in a pumping system was also made and included parametric, optimization, and tradeoff analyses to determine the most promising candidate concept. (ERA citation 04:025223)

PAT-APPL-6-023 109 PC **A02**/MF **A01**
Department of the Army Washington DC
Sampling Valve.
Patent Application,
David A. George, Bernard D. Strauss, and Irving H. Weisman. Filed 23 Mar 79, 10p AD-D006 395/8
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A fail-safe pneumatically operated by-pass sampling valve suitable for use in hazardous chemical processes utilizes a manually operated spool valve to initiate a pneumatically operated piston driven crank to rotate a sampling valve. The sampling valve withdraws a sample amount of fluid from a process line without disturbing normal process flow. A pneumatically connected spindle valve and a plurality of limiting valves are proximately positioned and operatively connected to the piston to automatically move the piston actuating member from a normally closed non-sampling position to a sampling position and then back to a normally closed non-sampling position. (Author)

PATENT-3 134 389 Not available NTIS
National Aeronautics and Space Administration, Washington, DC.
Flow Diverter Value and Flow Diversion Method.
Patent,
S. B. Arline, and R. L. Carlson. Filed 4 Aug 61, patented 26 May 64, 5p N79-33468/6, PAT-APPL-129 379
Supersedes PAT-APPL-129 379-61. Subm-Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

A flow diverter valve applicable to any fluid flow system requiring rapid bleed or bypass is disclosed. Examples of application of the flow diverter valve to a liquid rocket and a turbojet aircraft engine are given. Features of the valve include: (1) an independent fluid source is used to activate the flow diverter valve toward its closed position during its initial stage of travel; (2) the flow diverter port area and size is unlimited and the valve travel is unlimited; and (3) the valve housing is fabricated such that the valve can be a one step valve, a two step valve, or include as many steps as are found desirable.

13L. Safety Engineering

AD-A075 737/7 PC **A09**/MF **A01**
Lockheed-California Co Burbank
General Aviation Airplane Structural Crashworthiness Programmer's Manual. Revision.
Final rept. Nov 77-Dec 78,
William L. LaBarge. Jun 79, 180p LR-23683-REV, FAA-RD-78-120-REV
Contract DOT-FA75WA-3707
Revision of report dated Dec 78, AD-A063 640. Prepared in cooperation with Cessna Aircraft Co., Wichita, KS.

This Programmer's Manual is one of a series of operational documents for program KRASH. In this manual, pertinent information is supplied which will facilitate bringing the program to an operational status on the user's computer system. This manual has been established in such a manner that it can be updated as more data becomes available. The subject material contained within each section can be expanded or revised, as necessary, without affecting the other sections. Each section contains its own numbering system which facilitates the task of updating the document. (Author)

NUREG/CR-1156 PC **A08**/MF **A01**
Science Applications, Inc., La Jolla, CA.
Environmental Assessment of Ionization Chamber Smoke Detectors Containing Am-241.
Technical rept. Jan-Oct 79,
R. Belanger, D. W. Buckley, and J. B. Swenson. Nov 79, 173p
Contract NRC-02-78-045

The NRC is reevaluating the adequacy of existing policy dealing with the distribution of consumer products containing radioactive material. One such consumer product is the ionization chamber smoke detector (ICSD), which in recent years has become widely distributed. This report is the assessment of the impact of ICSD's on people and the environment. Its benefits and risks are evaluated for presently-distributed ICSD's against alternatives. The work is intended to be a source of information for a generic environmental impact statement on consumer products containing radioactive material which will be written in the future. The report concludes that the sum of doses to the population from the annual production, distribution, use, and disposal of 14 million Am-241 ICSD's is much lower than that which could potentially result in one cancer death. The use of Am-241 ICSD's is justifiable as a means to prevent loss of life and property. The estimated benefit-to-risk ratio is more than 15,000.

N80-10434/2 PC **A02**/MF **A01**
Bionetics Corp., Hampton, Va.
The Potential of Carbon Fiber Induced Shock Hazards in Household Toasters.
J. A. Meyers. Sep 79, 24p NASA-CR-159147
Contract NAS1-15236

The average exposure to carbon fibers which produced a short and potential shock hazard in a household toaster was determined. Toasters are normally in the off state. They are used for brief periods during the day and have timed cycles during which power is applied. The possibility of a short occurring from the heating element to the case was investigated to find the exposure levels at which a potential shock hazard could appear. The short produced was tested to determine its importance.

PB80-108327 PC **A07**/MF **A01**
Anacapa Sciences, Inc., Santa Barbara, CA.
Visual Detection of Driving While Intoxicated. Project Interim Report: Identification of Visual Cues and Development of Detection Methods.
Final rept. Mar 77-Jan 79,
Douglas H. Harris, James B. Howlett, and R. Glen Ridgeway. Jan 79, 139p DOT-HS-805 051
Contract DOT-HS-7-01538

The report describes the initial phase of a two-phase project on the visual, on-the-road detection of driving while intoxicated (DWI). The purpose of the overall project is to develop and test procedures for enhancing on-the-road detection of DWI. The emphasis of the first phase was on the identification of visual cues and the development of procedures that effectively discriminate between DWI and driving while sober (DWS). The literature was reviewed, expert opinion was surveyed, 1288 DWI arrest reports were analyzed, and an on-the-road detection study was conducted. In the detection study, trained observers accompanied police officers on patrol and recorded 643 instances of driving behavior and vehicle actions that deviated from normal. In each instance, the patrol officer stopped the vehicle and measured the blood alcohol concentration (BAC) of the driver with a portable breath tester. A DWI detection guide was developed to facilitate the application of research findings to the on-the-road detection of DWI by police patrol officers. The guide consists of 23 visual cues, a value for each cue reflecting the ability of the cue to discriminate between DWI and DWS, and a set of three rules for estimating the probability of DWI for any set of observed cues. The 23 cues accounted for 92 percent of the cues observed during the detection study.

PB80-108665 PC **A02**/MF **A01**
National Transportation Safety Board, Washington, DC. Office of Evaluations and Safety Objectives.
Safety Report on the Progress of Safety Modification of Railroad Tank Cars Carrying Hazardous Materials.
13 Sep 79, 24p NTSB/SR-79/2

As a direct result of Safety Board efforts, the Department of Transportation in 1978 adopted an accelerated schedule for retrofitting tank cars carrying hazardous materials with safety equipment to protect against tank-head puncture and thermal rupture in accidents. One of the Safety Board's safety objectives during FY 1979 was to monitor the retrofit program to see that the safety modifications are completed as soon as possible. Review and monitoring of the tank car safety retrofit program indicate that: (1) The shelf coupler retrofit for DOT 112/114 tank cars was virtually completed within 6 months of the announcement of the accelerated schedule; (2) Headshields are not being retrofitted as rapidly as possible; (3) As a result of retrofit problems and the structure of the regulations, headshield installations on more than 1,000 tank cars may be delayed up to 1 year; (4) Shelf couplers and/or headshields performed effectively in protecting against tank-head puncture in two derailments investigated by the Safety Board in FY

1979; (5) On one recommendation, the Department of Transportation has exceeded the statutory time limit on responding to Safety Board recommendations; and (6) The Federal Railroad Administration agrees that DOT 105 tank cars should also be equipped with shelf couplers, but is unnecessarily delaying rulemaking action.

PB80-108673 PC **A03**/MF **A01**
National Transportation Safety Board, Washington, DC. Bureau of Accident Investigation.
Railroad Accident Report: National Railroad Passenger Corporation (AMTRAK) Head-End Collision of Train No. 111 and Plasser Track Machine Equipment, Edison, New Jersey, April 20, 1979.
Railroad accident rept. 20 Apr 79.
13 Sep 79, 31p NTSB-RAR-79-10

About 12:03 p.m., e.s.t., on April 20, 1979, National Railroad Passenger Corporation (Amtrak) passenger train No. 111 collided head-on with an Amtrak Plasser track machine at Edison, New Jersey. The track machine was destroyed, and the locomotive was heavily damaged. The lead truck of the passenger car behind the locomotive derailed. Seventy-one persons were treated for minor injuries, and one passenger and one onboard attendant were admitted to the hospital. Total property damage was about $353,600. The National Transportation Safety Board determines that the probable cause of the accident was the failure of (1) the train dispatcher to issue proper orders and to secure the route for the movement of the track machine and (2) a block operator to secure the traffic direction and route for the movement of the track machine. Contributing to the accident was the failure of several block operators to comply with operating instructions by permitting the track machine to proceed without securing proper authority. Also contributing to the accident was the operation of a passenger train with an inoperative radio.

PB80-109390 MF **A01**
Urbatronics, Inc., Teaneck, NJ.
Changing Fire Company Locations: Five Implementation Case Studies.
Warren E. Walker. Jan 78, 110p HUD-0000276, HUD/PDR-308
Contract HUD-H-2351
Paper copy available from the Sup. of Docs., Stock number 023-000-00456-9

Case studies are provided of five implementation strategies developed to mitigate problems affecting the manner in which fire companies are located and dispatched in five test cities -- Wilmington, Del., Trenton and Jersey City, N.J., Yonkers, N.Y., and Denver, Colo. The general problems addressed in the tests were (1) how many engine companies should the city have and where should they be located; (2) how many ladder companies should the city have and where should they be located; (3) how many firehouses should the city have, where should they be located, how many companies should be located in each, and in what sequence should new ones be built; and (4) how many fire companies should be sent to an incoming alarm, and should this number vary by time of day. Mathematical models used to evaluate alternative policies for each city are summarized, along with comparative alarm and travel time data for the five citywide fire departments. Finally, what happened in each of the five cities as a result of the development studies is described, and conclusions are drawn regarding implementation issues. The five analyses were performed in similar fashion; all addressed pivotal deployment issues and all used the same or similar models to study the issues. The same kinds of data were collected in each case, and the results were organized and published in a uniform manner. However, despite the similarities, the events in each city since publication of the results and recommendations have been strikingly different. In some cases, the recommendations have been or will be fully implemented; in others, the findings have been swept aside by political issues. In one city, while no changes have been made in the deployment of firefighting resources, a strong and permanent analytic unit with a number of successful analyses already to its credit has been created.

13M. Structural Engineering

AD-A075 774/0 Not available NTIS
Royal Military Coll of Canada Kingston (Ontario) Dept of Civil Engineering
Concrete L-Beams Subject to Combined Torsional Loads,
D. Wayne Kirk , and David G. McIntosh. 22 Aug 73, 15p
Availability: Pub. in Jnl. of the Structural Division, Proceedings of the American Society of Civil Engineers, v101 nST1 p269-282 Jan 75 (No copies furnished by DTIC).

No abstract available.

AD-A075 778/1 MF **A01**
Army Engineer Waterways Experiment Station Vicksburg Ms Geotechnical Lab
Evaluation of Effects of Panama Canal Deepening Upon the Stability of La Pita Hill.
Final rept.,
Wendell O. Miller. Sep 79, 307p Rept no. WES-GL-79-16
Availability: Microfiche copies only.

This report presents an analysis and evaluation of the stability, as well as provides design recommendations for La Pita Hill on the Panama Canal. The site was selected for study by the Panama Canal Company (PCC) based upon scheduled Canal deepening locations and stability of adjacent slopes. This report provides systematic, step-by-step guidance for preventing a massive failure of La Pita Hill caused by Canal deepening operations, i.e. blasting and excavation. The results are not intended for direct extrapolation either to other sites along the Canal or to small localized failures along the slopes adjacent to La Pita Hill. This report provides the basis for the future evaluation of slopes affected by Canal deepening but is not intended to set a precedence for the method of analysis. Any future study should be independent but should draw upon the experience gained from preceding analyses. (Author)

AD-A075 807/8 PC **A08**/MF **A01**
Army Natick Research and Development Command Ma
Finite Element Analysis of a Statically Loaded ISO Tactical Shelter.
Technical rept.,
Arthur R. Johnson , and Vitty P. Ciras. Jan 79, 159p Rept no. NATICK/TR-79/023

A finite element analysis of a 2.4 m x 2.4 m x 6.1 m (8 ft x 8 ft x 20 ft) 3-for-1 expandable Army Shelter has been made for static loads designated in the specifications for Army ISO(International Standard Organization) Tactical Shelters. The report includes a description of the load paths, an investigation of the load-carrying capability of the structure both with and without wall panels as structural members, recommendations for improving the design for static load response, a buckling analysis for the ISO stacking test, and a comparison of calculated and measured data for a series of tests performed on the prototype shelter analyzed in this report. (Author)

COO-2733-21 PC **A03**/MF **A01**
Cornell Univ., Ithaca, NY. Dept. of Theoretical and Applied Mechanics.
Experiment and Prediction in the Bending of a Nickel Beam at 200 exp 0 C.
J. A. Mautz, and E. W. Hart. May 79, 29p
Contract EY-76-S-02-2733

The results of an experiment on the bending response of a Nickel prismatic beam under four point loading at 200 exp 0 C are described. The specimens have been subjected to histories of steady applied moment with a sequence of step changes both positive and negative. The measured results are compared with predictions based on Hart's constitutive equations. The experimental conditions and procedures are described. The experiment and the predictions are compared with prior studies. (ERA citation 04:052067)

PB80-106834 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Civil Engineering.
Optimum Seismic Protection for New Building Construction in Eastern Metropolitan Areas: A Review of Recent Studies on the Economic Value of a Human Life,
M. H. Ackroyd, and C. A. Cornell. Mar 73, 17p
INTERNAL STUDY-31, NSF/RA/E-73/579
Grant NSF-GK-27955

Factors pertaining to the problem of quantifying the value of human life are enumerated, and some of the schemes and rationale that have been used in such quantification are reviewed. Factors considered in the loss of life involve direct economic costs such as hospitalization and legal services as well as indirect economic costs such as loss of future production and consumption. Also considered are non-economic losses such as the suffering of a bereaved family. Distinctions are drawn between economically motivated questions and those based on social and moral values. Other issues concern the difference between a statistical life and a specific individual, and scale effect (loss of X number of lives per X number of events). A survey of studies made in the U.S. and France on the value of human life is presented. Specific schemes used to assign a dollar value to a human life include assessments for traffic accidents, air crashes, and castastrophic events. In evaluating money costs due to illness or death, several calculations are given. It is noted that additional factors need to be considered in basing a valuation of human life on expected lifetime earnings. Results of various studies' estimates of the value of human life are presented in tabular form.

PB80-109226 PC **A03**/MF **A01**
NAHB Research Foundation, Inc., Rockville, MD.
All-Weather Home Building.
Final rept.,
Nov 75, 47p HUD-0000247
Contract HUD-H-2047R

To determine the experiences of contractors in building in a variety of weather conditions, the following tasks are reported and discussed: (1) a summary of literature review and annotated bibliography for all - weather home building, (2) a questionnaire survey of home builders to determine the extent to which builders are affected by adverse weather conditions and methods and techniques used to build during these conditions, (3) field interviews with home builders in various parts of the country, (4) preparation of an all - weather home building manual, (5) development of a slide / tape program on building methods used in a variety of weather conditions, (6) a program for disseminating information, and (7) an outline of a seminar for builders to discuss all - weather building. Recommended procedures for future programs of this type are offered. Problems encountered in the study are also included. Brief descriptions of new products, equipment, and methods needed to aid all - weather building are given. These are categorized according to cold and hot, dry climates. Government actions believed to be helpful in reducing seasonality in home building are discussed, along with suggested incentives by the Federal Government to reduce seasonality in home building. Since the Federal Government does not provide sufficient weather data for daily operational use of home builders, additional hourly weather forecasting for builders is needed. Seventeen subjects are recommended for additional research.

PB80-109283 PC **A12**/MF **A01**
Department of Housing and Urban Development, Washington, DC. Office of the Assistant Secretary for Housing Production and Mortgage Credit.
Used Mobile Homes Report.
Aug 75, 253p HUD-0000255

Data from the 1970 Census, a 1973 Survey of Housing undertaken by the Census Bureau, reports from the National Bureau of Standards and the Massachusetts Institute of Technology, a study of used mobile homes made in 1975 under contract with HUD, and a survey of State mobile home standards and inspection provisions are used for this study. It presents statistics on distribution of mobile homes by State, analyzes mobile home financing, gives demographic data on purchasers of mobile homes, and explains data on deterioration and loss in the mobile home inventory including disposal of used mobile homes. Information ob-

tained from 38 States on regulatory programs to insure the safety of mobile homes is summarized. It is concluded that existing State mobile home construction and safety standards rarely are applicable to used mobile homes and are inadequate for assuring a sound inventory of existing mobile homes. It is also concluded that existing State standards and procedures for disposal of used mobile homes are inadequate and that implementation of the National Mobile Home Construction and Safety Standards Act of 1974 will not improve the used mobile home situation. Specific Federal and State actions directed at used mobile homes are recommended. These include legislation, inspection procedures for used mobile homes, and educational efforts. The report contains extensive statistical data plus a tabular comparison of State mobile home standards and regulations.

PB80-109747 PC **A06**/MF **A01**
Dames and Moore, Washington, DC.
Design and Construction Standards for Residential Buildings in Coastal High Hazard Areas. Report of Current Practice.
9 Feb 79, 117p HUD-0000385
Contract HUD-H-2851

Current practices are reported regarding design and construction standards for residential building in coastal high hazard areas. The task for this report consisted of (1) delineating sites susceptible to storm wave action, with a history of storm damage, and where local officials have a knowledge of past and present building practices and of the National Flood Insurance Program, and (2) inspecting selected sites along various sections of the U.S. coastline. For regional investigation, the U.S. was divided into the North Atlantic Coast, South Atlantic Coast, Gulf Coast, Pacific Coast, and Hawaiian Coast. Data were collected from interviews with government personnel, consultants familiar with the areas, and individuals concerned with design and construction in the coastal zone, and from site visits. Although geographic areas provide unique experiences, many basic factors thread through them all: (1) an area does not develop the necessary codes, regulations, and techniques required to resist damage from coastal storms until one such storm has a severe local impact; (2) a key element in all attempts to resist coastal flooding damage has been the trend toward deep foundations which penetrate below anticipated erosion elevations; and (3) the main structural element is the integration of the roof, framing, and foundation system into one unit. These items were observed in various stages of development along the coastlines with the most sophisticated structures being found in the areas where storms have been more frequent and intense -- the South Atlantic and Gulf Coasts. Building codes and guidelines must be developed to implement and enforce new design and construction techniques, which integrate the requirements of zoning ordinances, Federal Insurance Administration flood - proofing guidelines, and local planning documents. Study data, maps, figures illustrating structures studied, references, and the survey instrument are provided.

PB80-109887 PC **A03**/MF **A01**
Forest Products Lab., Madison, WI.
Strength and Shear Modulus of Several Construction Adhesives as Influenced By Environment and Loading Conditions.
Bryan H. River. May 78, 43p HUD-0000610

The strength and shear modulus of various mastic construction adhesives were tested in this study using the thick adherend pal shear test method. The key feature of this test method is control of the joint geometry to achieve a relatively uniform stress - strain distribution throughout the adhesive layer under load. Sheer modulus was evaluated for effects of temperature, moisture, and stress level. Strength was evaluated for effects of temperature and moisture levels. Limited tests were made for the effects of cyclic loading, stress damage, and rate of loading upon adhesive shear modulus. Additional tests were made to study the effects of temperature, moisture, and stress levels upon shear modulus. Adhesive shear strength measured at several levels of temperature and moisture showed that all adhesives responded with varying sensitivity to increases in water, temperature, and stress. Joints formed by all three adhesives fail at or near the bond interface when tested in the water - soaked condition. Repeated loading followed by unloading affects the shear modulus of elastomer - based materials. The result of cycling joints to a higher stress level and then back to a lower one varied with the adhesive (the crosslinked neoprene - based adhesive recovered 97 percent of its lower level shear modulus after high - level stressing, the polyurethane adhesives recovered 110 and 160 percent of the lower shear modulus, and the noncrosslinked adhesive recovered only 60 percent). Study data, equations, illustrations, and references are provided.

14. METHODS AND EQUIPMENT

14B. Laboratories, Test Facilities, and Test Equipment

AD-A075 734/4 PC **A02**/MF **A01**
Army Test and Evaluation Command Aberdeen Proving Ground Md
Solar Radiation Tests.
Final rept. on test operations procedure,
15 Oct 79, 18p Rept no. TOP-4-2-826
Supersedes Rept. no. MTP-4-2-826, AD-866 464, Rept. no. MTP-5-2-593, AD-725 522, and Rept. no. MTP-6-2-532, AD-867 032.

Describes methods for evaluating the effects of solar radiation and heat on military materiel and its operation through the use of environmental chambers. Includes a procedure for establishing an equivalent high temperature for use in environmental chamber high-temperature tests. (Author)

AD-A075 770/8 Not available NTIS
Montreal Univ (Quebec) Dept of Chemistry
A Polarization Cell for Organic Electrolytes,
G. A. Capuano , and W. G. Davenport. 30 Jul 73, 6p
Availability: Pub. in Jnl. of the Electrochemical Society, v122 n4 p453-457 Apr 75 (No copies furnished by DTIC).

No abstract available.

AD-A075 772/4 Not available NTIS
Materials Research Labs Ascot Vale (Australia)
Nicrosil and Nisil: Their Development and Standardization,
N. A. Burley , G. W. Burns , and R L. Powell. 1975, 11p
Availability: Pub. in Institute of Physics Conference Series, n26 ch4 p162-171 1975 (No copies furnished by DTIC).

No abstract available.

AD-A075 880/5 PC **A02**/MF **A01**
National Bureau of Standards Washington Dc
Tests of Tubular Chromel-Alumel Thermocouples.
Technical rept.,
Andrew I. Dahl , and Paul D. Freeze. May 52, 12p WADC-TR-52-122
Contract AF 33(038)51-4063

This report presents the results of response rate and recovery factor tests of two experimental Chromel-Alumel thermocouples. The thermoelements are tubular in form and the sensing junction made by butt-welding the elements. (Author)

AD-A075 921/7 PC **A04**/MF **A01**
Genrad Inc Concord Ma
Automatic Microcircuit Bridge and Autobalancing Unit.
Final rept. Jun 76-May 77,
William F. Byers , Robert J. Hanson , and William J. Riley. May 79, 74p DELET-TR-76-1380-F
Contract DAAB07-76-C-1380

This report summarizes the design and test of a Microcricuit Bridge and Balancing Unit to be used in a precision measurement of quartz crystal resonators. Design goals for the Bridge and Balancing Unit were to measure resistance with a 5% accuracy and capacitance with a + or - 0.1 pF accuracy from .8 to 220 MHz and at temperatures from -50 C to +105 C. The autobalance Unit will perform initial balance, final balance, and plus/minus susceptance offset on command. Based on the measured data, it will be possible to calculate the Q of the crystal resonator being tested.

AD-A076 044/7 PC **A04**/MF **A01**
Cornell Univ Ithaca N Y Graduate School of Aerospace Engineering
Shock Reflection from Edges and from Slotted Walls.
Technical rept.,
T. F. Sun. Jul 52, 71p WADC-TR-52-164
Contract AF 33(038)-21406

The flow characteristics behind weak stationary shock waves reflected from various edges lying in the mainstream direction are determined according to linearized theory. Five different types of edges are considered, made up of various combinations of solid and free plane surfaces. An assumption regarding the singularity of one of the perturbation velocity is required in order to render the solutions unique. By superposition of such basic 'edge' solutions, the flow behind a shock wave reflected from a wall with a slot (i.e., a strip of free-surface between panels of solid wall) and from multiply-slotted walls are obtained. These solutions apply only to regions upstream of multiple interactions of the slot edges; however, these regions include the most interesting regions of flow in the case of reflection from slotted wind-tunnel wall, for example. The relation of the single-slot problem to the problem of a narrow rectangular supersonic wing is discussed. (Author)

AD-A076 052/0 PC **A02**/MF **A01**
National Bureau of Standards Washington Dc
Tests of Westinghouse Sonic Pyrometers.
Technical rept.,
Andrew I. Dahl, and Paul D. Freeze. Jan 52, 14p WADC-TR-52-23
Contract AF 33(038)51-4063

This report presents the results of performance and calibration tests of two sonic-flow thermocouple pyrometers designed and constructed by the Westinghouse Electric Corporation. (Author)

AD-A076 054/6 PC **A03**/MF **A01**
Wright Air Development Center Wright-Patterson AFB Oh
A Study of Mach One Wind Tunnels.
Interim rept.,
David T. Barish. Apr 52, 39p Rept no. WADC-TR-52-88

The simulation in wind tunnels of flows with a sonic free stream velocity is studied from the theoretical standpoint, and a preliminary experimental phase is also described. The solutions which are valid asymptotically are extended to include higher order terms so that flow patterns at distances of technical interest from bodies with and without lift can be discussed. This is done with a view toward determining the essential characteristics which streamlines near a wind tunnel wall would have to possess if the simulation of Mach One flow were to be obtained, and also toward determining which body shape parameters are needed in order to apply the correct scale factors. The results indicate that the ratio of model to tunnel size where a single parameter is sufficient to give the conditions at the wall is quite large. A set of preliminary wing tunnel tests was made with inclined plane walls in the tests section. This approximation of the correct streamline contour yielded data which appears to be in good agreement with the theoretical results at Mach One. (Author)

AD-A076 056/1 PC **A03**/MF **A01**
California Univ Berkeley Inst of Engineering Research
Equipment for Testing the Creep Properties of Metals under Intermittent Stressing and Heating Conditions. Part 1.
Technical rept.,
Lawrence A. Shepard , and John E. Dorn. Jul 52, 32p WADC-TR-52-101-PT-1
Contract AF 33(038)-11502
See also Part 2, AD44 977.

Very little is known about the separate or combined effects of intermittent heating and stressing on the elevated temperature creep and creep-rup-

ture characteristics of aircraft structural metals. Such information is important since aircraft and engines will be subject to these conditions. Between flights, loads and temperatures are low; during flights, they are high. Exact service conditions cannot be reproduced in the laboratory, but arbitrary cycles have been chosen for initial work. In view of the need for more complete information on the effects of such intermittent heating and stressing on the creep and creep-rupture properties of structural sheet materials, an experimental program on this subject was initiated. (Possible theoretical analyses of the results will be made later.) One of the major problems of the program was the development of suitable equipment for the investigation. A description of four creep testing machines, specially designed for this program, with automatic electronic control units is given herein. This equipment is designed to produce any combination, separately or simultaneously, of intermittent heating and stressing of creep-rupture sepcimens, in or out of phase. (Author)

AD-A076 131/2 PC **A21**/MF **A01**
Aeronautical Research Labs Melbourne (Australia)
Transonic Wind Tunnel Tests on a Series of Two-Dimensional Aerofoils in a Solid Wall Test Section,
B. D. Fairlie , and N. Pollock. Jan 79, 500p Rept no. ARL/AERO NOTE-384

Transonic wind tunnel tests are reported on a series of two-dimensional models in a test section equipped with four solid walls. The tests were conducted on two geometrically similar models of each of two aerofoil sections -- NACA-0012 and BGK-1 -- and covered a range of Mach numbers between 0.5 and 0.82. The main purpose of the tests was to provide a body of data suitable for testing the validity of linear interference theory without the complication of the unknown boundary conditions associated with non-solid wind tunnel walls. (Author)

AD-A076 183/3 PC **A03**/MF **A01**
Air Force Materials Lab Wright-Patterson AFB Oh
Microencapsulated Fluorescent Dye Penetrant.
Final rept. Oct 77-Jan 79,
S. Allinikov. Jul 79, 35p Rept no. AFML-TR-79-4027

Microencapsulated fluorescent dye pentrant materials were evaluated for feasibility as a technique to detect cracks on metal surfaces when applied as a free flowing dry powder. Various flourescent dye solutions in addition to a commercial penetrant (Zyglo ZL-30) were microencapsulated and tested on nondestructive inspection crack standards. The material could be applied dry with standard spray apparatus, and removed by blowing air, vacuum or with a detergent water mixture. Indications of cracks 0.5 microns in width or larger could be visually observed in the tests conducted to date. (Author)

ANL/MSD-79-5 PC **A02**/MF **A01**
Argonne National Lab., IL.
Nondestructive Evaluation Techniques for High-Temperature Ceramic Components. Seventh Quarterly Report, April-June 1979.
Jul 79, 24p
Contract W-31-109-ENG-38

SiC samples with various microstructures were examined by through-transmission acoustic microscopy. The microstructures were ranked with respect to ease of inspection. Some preliminary results were presented on the use of a transducer and acoustic mirror for bore-side ultrasonic inspections of SiC tubing. The technique of photoacoustic microscopy is discussed. A simple test was run to illustrate the principles involved in this technique. (ERA citation 04:055398)

CONF-790839-2 PC **A04**/MF **A01**
Oak Ridge National Lab., TN.
Quantitative X-Ray Microanalysis in an AEM: Instrumental Considerations and Applications to Materials Science.
N. J. Zaluzec. 1979, 68p
Contract W-7405-ENG-26
37. annual Electron Microscopy Society of American meeting, San Antonio, TX, USA, 13 Aug 1979.

There are a wide variety of instrumental problems which are present to some degree in all AEM instruments. The nature and magnitude of these artifacts can in some instances preclude the simple quantitative interpretation of the recorded x-ray emission spectrum using a thin-film electron excitation model; however, by judicious modifications to the instrument these complications can be effectively eliminated. The specific operating conditions of the microscope necessarily vary from one analysis to another depending on the type of specimen and experiment being performed. In general, however, the overall performance of the AEM system during x-ray analysis is optimized using the highest attainable incident electron energy; selecting the maximum probe diameter and probe current consistent with experimental limitations; and positioning the x-ray detector in a geometry such that it records information from the electron entrance surface of the specimen. (ERA citation 04:053572)

CONF-790839-3 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Dependence of Secondary Electron Image Contrast of Periodic Objects Upon Probe Diameter.
J. Bentley, and R. W. Carpenter. 1979, 2p
Contract W-7405-ENG-26
37. annual Electron Microscopy Society of American meeting, San Antonio, TX, USA, 13 Aug 1979.

The effect of probe diameter upon secondary electron image contrast of periodic objects has been studied systematically. Interest in the topic arose following the observation of out-of-focus SEM images of conventional mesh support grids, where the basic periodicity was visible even with probe diameters many times the periodic spacing. The instrument used was a JEM-120CX/ASID operated in the SEM mode at low magnification with the objective lens off and other lenses in the free-control mode. The probe diameter at the specimen position was controlled by the continuously variable second condenser lens current. The first intermediate lens was focussed at the specimen position, thus allowing a determination of the probe diameter from the magnified shadow image, which could be photographed using the conventional TEM camera. The specimen used was a copper bar grid with spacings approx. = 125 mu m. (ERA citation 04:053573)

COO-2945-2 PC **A03**/MF **A01**
Minnesota Univ., Minneapolis. Dept. of Chemical Engineering and Materials Science.
Continuous Chemical Reaction Chromatography. Progress Report, 15 January 1978--1 February 1979.
R. Aris, and R. W. Carr, Jr. Jan 79, 32p
Contract EY-76-S-02-2945

Construction of a packed, annular cylindrical apparatus with rotating inlet for continuous reaction chromatography was completed. It is being used to investigate the room temperature acid-hydrolysis of methyl formate. Adsorption isotherms for methyl formate, methanol and formic acid on charcoal, the bed packing, were measured. Radial dispersion effects were tested for pure components. Construction of a second apparatus is nearing completion. It is a rotating, packed, cylindrical annulus with fixed inlet, designed for study of catalytic gas phase decompositions at elevated temperatures. A theoretical investigation of a reversible isomerization of type A reversible B in a counter current chromatographic reactor was done. (ERA citation 04:053499)

COO-4237-3 PC **A02**/MF **A01**
Chicago Univ., IL.
Systems Analysis for Materials Optimization. Technical Report for 1979.
R. S. Berry. 1979, 3p
Contract EC-77-S-02-4237

A brief summary of the research program at the University of Chicago on system analysis for materials optimization is presented. (ERA citation 04:051898)

DOE/EIA-0038 PC **A02**/MF **A01**
Energy Information Administration, Washington, DC.
US Department of Energy Guide to Selected Metric (SI) Units and Symbols.
M. E. Golby. Apr 78, 20p

A list of SI and other units and symbols used in the energy field is given to provide a reference tool for spelling, capitalization, etc. No conversion tables between metric and other units are provided. Included with the list are suggestions about how to modify some of the units and their symbols for use in those systems where character sets lack the necessary SI members and where the system output is interpreted by human beings, along with the very concise October 26, 1977, National Bureau of Standards Federal Register notice concerning US adoption of SI standards. (ERA citation 04:052417)

EPRI-FP-844(V.1) PC **A06**/MF **A01**
Washington Univ., Seattle. Dept. of Civil Engineering.
Development of a Cascade Impactor System for Sampling 0.02 to 20 Micron Diameter Particles. Final Report.
M. J. Pilat, G. A. Raemhild, E. B. Powell, G. M. Fioretti, and D. F. Meyer. Aug 78, 111p

An improved cascade impactor sampling train was constructed to size particles emitted from electric power utility generating stations. The new sampling train components were designed to accompany the UW Mark 3-4 Source Test Cascade Impactor. The capability of this instrumentation to perform in-stack particulate sizing in the 0.02 to 20 micron diameter range has been demonstrated. Source tests were conducted at the coal-fired power boiler at the J.E. Corette Power Plant, Billings, Montana; the Nucla Power Plant, Nucla, Colorado; and the University of Washington Power Plant, Seattle, Washington. (ERA citation 04:025258)

IS-M-187 PC **A03**/MF **A01**
Ames Lab., IA.
Anion Chromatography with Low-Conductivity Eluents.
D. T. Gjerde, J. S. Fritz, and G. Schmuckler. 1979, 30p CONF-790931-2
Contract W-7405-ENG-82
14. international symposium on advances in chromatography, Lausanne, Switzerland, 24 Sep 1979.

A new and very simple system is described for separation and determination of mixtures of inorganic and organic anions. The column is filled with a macroporous anion-exchange resin of 0.007 to 0.07 meq/g exchange capacity. The eluent is a very dilute (0.0001 to 0.00065 M) solution of an organic acid salt, such as potassium benzoate or phthalate. The eluent conductance is sufficiently low that the separated anions can be detected with a simple conductance detector. Numerous examples of actual separations are shown. In some cases concentrations of anions below 1 ppM could be detected. The applicability of the new system to real samples is demonstrated by several examples. 10 figures, 2 tables. (ERA citation 04:055317)

ITEF-148(1977) PC **A03**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Teoreticheskoi i Eksperimental'noi Fiziki.
"Poisk" Semiautomatic Stereocoordinate Measurer.
V. D. Neustroev. 1977, 41p
In Russian.
U.S. Sales Only.

A semiautomatic stereocoordinate measurer "POISK", a device for measuring angular and linear coordinates of three-dimensional images of tracks, is described. The device includes a measuring desk equipped with pickups provided with the Grey code, an electronic console, and a PL-80 type perforator. The division value of the counting system is: 20' for measuring anlges, and 0.1 mm for measuring lengths. The measured coordinates are transmitted to the channel for communication with the BESM-4 computer by the parallel-series method. One bit is adopted as the format of a unit portion. The asynchronous method is used in data transmission. The feedback between computer and operator is accomplished with the aid of a light tableau. Data delivery to a punch card is provided as a secondary mode. Using the device described it is possible to automate the process of measuring by any stereoprojector with an optical system moving vertically and with a working space which does not exceed 400x400x1000 mm. After insig-

nificant circuit changes the electronic console of the device is capable of ensuring data delivery simultaneously from two "flat" measuring desks equipped with pickups provided with the Grey code. (Atomindex citation 10:452914)

JINR-R-14-11309 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Device on the Base of Proportional Chambers for Thin-Layer Radiochromatograms Analysis.
Yu. S. Anisimov, Yu. V. Zanevskii, A. B. Ivanov, V. N. Kalinin, and V. D. Peshekhonov. 1978, 9p
In Russian.
U.S. Sales Only.

To reduce the radiochromatogram processing time and to increase the accuracy of the quantitative measurements in the investigation of biologically active substances labelled with exp 3 H, exp 14 C, exp 32 P, the apparatus "Uran" has been constructed. The apparatus consists of a positionally sensitive detector (PSD), recording apparatus and data presentation system. The PSD is designed on the base of proportional chambers aimed at detecting beta -radiation. The PSD operates on a gas mixture of argon with 15% addition of carbon dioxide. In the radio-chromatogram analysis, the localization of radioactive zones on te substrate, isotope identification and zone activities measurement are carried out during one cycle of measurements (15 min). The apparatus posesses high sensitivity, small dead time, high spatial solution. (Atomindex citation 10:449895)

KFK-2728 PC **A07**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Kernphysik.
Low-Noise Measurement of an RF Amplitude on the Basis of the Non-Linearity of a Reactance Characteristic.
Diss,
R. Jaeger. Dec 78, 129p
In German.
U.S. Sales Only.

In the development of fast RF amplitude measurement systems the accuracy is limited above all by the statistical errors of measurement. This limitation is smaller in a non-d.c. measurement technique as compared with a d.c. technique and is constituted by the thermal noise of the equivalent resistances. This is the first report on such a measuring system utilizing the non-linear capacity characteristic of a varactor diode to demodulate the RF amplitude. An accuracy of the amplitude measurement of 10 exp -5 was achieved in the S band (2.7 GHz) at room temperature and a bandwith of 100 kHz. (Atomindex citation 10:452978)

LA-UR-79-2039 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Contributions of Shock-Wave Physics to High-Pressure Standards.
J. N. Fritz. 1979, 8p CONF-790709-10
Contract W-7405-ENG-36
VII International AIRAPT conference, La Creusot, France, 30 Jul 1979.

Obtaining a primary pressure standard by dynamic means is discussed. The evolution and current state of the copper Hugoniot curve and its reduction to an isotherm is given. Similar, but less complete, considerations are given for tantalum. (ERA citation 04:050329)

NBSIR-78-1535 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Laboratories Technically Qualified to Test Solar Collectors in Accordance with ASHRAE Standard 93-77: Summary Report.
W. J. Niessing. Nov 78, 38p
Contract EA-77-A-01-6010

In fulfilling its responsibilities under the National Program for Solar Heating and Cooling of Buildings established as a result of the Solar Heating and Cooling Demonstration Act of 1974 (PL 93-409) and related legislation, the Energy Research and Development Administration (ERDA) requested the National Bureau of Standards (NBS) to develop criteria for assessing the capabilities of laboratories for testing solar collectors, to identify those laboratories qualified to test solar collectors, and to develop a plan for the certification of solar collectors. NBS engaged the professional services of ARI Foundation, Inc. (ARIF), a subsidiary of the Air-Conditioning and Refrigeration Institute (ARI), to identify laboratories qualified to test solar collectors and to develop documentation for a solar collector certification program. The identification of qualified solar collector testing laboratories is reported. The procedures used by ARIF and the results of their evaluation are discussed, and the laboratories evaluated as qualified to test solar collectors in accordance with American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Standard 93-77 are listed. Continuing activities for laboratory accreditation are identified. (ERA citation 04:051319)

N80-10231/? PC **A02**/MF **A01**
Southampton Univ. (England).
Cryogenic Wind Tunnel Activities at the University of Southampton.
M. J. Goodyear. Sep 79, 10p NASA-CR-159144
Grant NSG-7523

The characteristics and behavior of a 0.3m transonic cryogenic wind tunnel are discussed. The wide band of usable Reynolds numbers is analyzed along with a flow visualization technique using propane. The combination of magnetic suspension with the cryogenic wind tunnel is described. An outline of the circuit showing the locations of the magnet system and the features of the tunnel are presented.

N80-10232/0 PC **A02**/MF **A01**
Royal Aircraft Establishment, Farnborough (England).
Development of an Air Heater for a Mixture Formation Test Rig.
H. D. Distelrath. May 79, 24p RAE-TRANS-2012, BR70095
Tran-Transl. Into English of Report Ib-351-77/36 (Germany, F.R.), Dvl, Aachen, Dec. 1977 24 p.

The design and development of a 400 kW air heater for a mixture formation test rig is described. Temperature requirements, the metal chosen for the heat conductor, the heating coils, and the thermal insulation are assessed. Electrical heaters used to heat air for hypersonic wind tunnels are discussed.

N80-10459/9 PC **A11**/MF **A01**
National Aeronautics and Space Administration, Washington, D. C.
Fundamentals of Heat Measurement.
O. A. Gerashchenko. Aug 79, 234p NASA-TM-75490
Contract NASW-3199
Tran-Transl. Into English of "Osnovy Teplometrii" (Kiev), Naukova Dumka Press, 1971 p 1-192. Misc-Original Language Document Was Announced as A72-35495. Subm-Transl. By Kanner (Leo) Associates, Redwood City, Calif.

Various methods and devices for obtaining experimental data on heat flux density over wide ranges of temperature and pressure are examined. Laboratory tests and device fabrication details are supplemented by theoretical analyses of heat-conduction and thermoelectric effects, providing design guidelines and information relevant to further research and development. A theory defining the measure of correspondence between transducer signal and the measured heat flux is established for individual (isolated) heat flux transducers subject to space and time-dependent loading. An analysis of the properties of stacked (series-connected) transducers of various types (sandwich-type, plane, and spiral) is used to derive a similarity theory providing general governing relationships. The transducers examined are used in 36 types of derivative devices involving direct heat loss measurements, heat conduction studies, radiation pyrometry, calorimetry in medicine and industry and nuclear reactor dosimetry.

N80-10476/3 PC **A05**/MF **A01**
ITT Aerospace/Optical Div., Fort Wayne, Ind.
Study of a Stereo Electro-Optical Tracker System for the Measurement of Model Deformations at the National Transonic Facility.
Final Report.
R. J. Hertel. Oct 79, 82p NASA-CR-159146
Contract NAS1-15629

An electro-optical method to measure the aeroelastic deformations of wind tunnel models is examined. The multitarget tracking performance of one of the two electronic cameras comprising the stereo pair is modeled and measured. The properties of the targets at the model, the camera optics, target illumination, number of targets, acquisition time, target velocities, and tracker performance are considered. The electronic camera system is shown to be capable of locating, measuring, and following the positions of 5 to 50 targets attached to the model at measuring rates up to 5000 targets per second.

N80-10477/1 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, D. C.
Semiconductor Millimeter and Centimeter Wave Radiometer for the Study of the Radiation of an Underlying Surface.
G. S. Bordonskiy, A. N. Zazinov, Y. A. Kirsanov, M. K. Kravchenko, and Y. B. Khapin. Oct 79, 25p NASA-TM-75671, PR-321
Contract NASW-3199
Tran-Transl. Into English of Report PR-321 (Moscow), 1977 25 p. Subm-Transl. By Kanner (Leo) Associates, Redwood City, Calif. Original Document Prepared by Academy of Sciences (Ussr), Moscow.

A theoretical and experimental investigation of a superheterodyne radiometer system with input frequency converter and intermediate frequency modulation is presented. Conditions are found, at which the temperature sensitivity of the device does not deteriorate. A sensitivity function to external parameters (temperature, heterodyne power) of a radiometer system with intermediate frequency modulation and a Schottky diode frequency converter is presented and calculated. Use of a frequency converter at the second harmonic of the heterodyne permitted simplication of the radiometer design and the use of a semiconductor heterodyne. A 3 cm range intermediate frequency amplifier permitted the use of centimeter wave radiometer signals. Fluctuation sensitivity of radiometers with a 1 sec time constant is 0.3 K at 3.4 mm and 0.06 K at 3 cm.

N80-10517/4 PC **A02**/MF **A01**
Royal Aircraft Establishment, Farnborough (England).
A New Method of Electric Measurement of Crack Length.
G. Baudin, and H. Policella. May 79, 24p RAE-TRANS-2016, BR70094
Tran-Transl. Into English from Rech. Aerosp. (France), V. 4, 1978 p 195-203.

Improvements on devices used for determining the existence or propagation of a crack in an electrically conducting material are presented. The procedure consists in ensuring a pulsed electric supply, which reduces the response time of the measurement, and, more important still, makes it free of noise and of the constant current amplifier zero drift. In case of cyclic loadings, the pulse may be synchronized with these loadings. The great flexibility of use, the performance obtained, and applications of the instrument are emphasized.

PAT-APPL-6-026 371 PC **A02**/MF **A01**
Department of the Army Washington DC
Pressure Relief Manometer.
Patent Application,
Tetsuyuki Hirata. Filed 2 Apr 79, 11p AD-D006 397/4
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention relates to manometers and more particularly to a manometer adapted to contain and control mercury spillage in the laboratory. Manometer systems for measuring changes of gas pressures are well-known. Prior art devices generally comprise a U-tube, constructed of a glass tubing having one end open to the atmosphere, and the other to the region where the pressure is to be measured. Another type has one end of the om; U-tube to the pressure region and the other end is sealed off after evacuation. Where the pres-

sure is different from atmospheric, the liquid with which the manometer is partially filled will stand higher in one leg of the tube than in the other. However, sudden pressure surges during testing can frequently be of sufficeint magnitude to blow mercury out of the apparatus. If the end of the manometer is sealed the sudden impact against the seal end of the glass tubing would strike with sufficient force to break the tubing and cause mercury spillage on to personnel, equipment and the laboratory area. Since mercury is toxic, it is a peril to personnel and it must be properly controlled preferably within the containing unit. In addition certain U-type manometers have the disadvantages of the weight of the mercury resting on one arm of the manometer causing a weak point at the base of the U-tube. (Author)

PAT-APPL-6-027 350 PC **A02**/MF **A01**
Department of the Army Washington DC
Gas-Liquid Absorption Apparatus and Method.
Patent Application,
H. Feller. Filed 5 Apr 79, 25p AD-D006 398/2
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An appartatus and process for removing contaminants in a gas through absorption in a liquid absorbent is provided wherein the apparatus comprises a first tube having a gas inlet for receiving a contaminant enriched gas and an outlet, and a second tube for transporting a liquid absorbent having a liquid outlet communicating with said gas inlet for introducing said liquid absorbent into said first tube, whereby said liquid absorbent and said contaminant enriched gas are contacted concurrently in said first tube to form a contaminant enriched liquid absorbent and a contaminant depleted gas. Preferably a section of the tube is disposed along the outer surface of the first tube and an outer tube surrounds the first tube encasing the section of the second tube. In the process of this invention, a contaminant enriched gas is introduced into the gas inlet of the first tube and is contacted concurrently with a thin, moving layer of liquid absorbent introduced to the gas inlet via the second tube. The so-formed contaminant enriched liquid absorbent and contaminant depleted gas is withdrawn from the outlet and separated in a separation vessel after which the liquid absorbent may be analyzed. (Author)

PAT-APPL-6-053 476 PC **A02**/MF **A01**
Department of Agriculture, Washington, DC.
Cyclone Dust Analyzer for Determining Microdust Content in Fibers.
Patent Application,
Myles A. Patureau, and Michael Murray. Filed 29 Jun 79, 13p PB80-101017
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A means of analyzing the microdust in cotton which causes lung disorders and diseases has become an important field of research in the textile industry. An apparatus for removing dust from a fiber sample for subsequent analysis is disclosed. A first upper cylindrical chamber containing a fiber sample has a tangential air jet and a radical air jet installed to swirl and tumble the fiber sample in a cyclonic fashion, thus liberating the dust from the sample when either a positive or a negative pressure is applied through the air jets. The liberated dust particles are then screened out through a 100 mesh screen filter and exhausted through a funnel. The device can be equipped with a second stage chamber containing a plurality of step-stage filters and a third stage plurality of microfilters to selectively screen the dust particles. A blow bottle containing an aqueous medium to absorb even the finest dust particles or gas can also be added as a fourth stage.

PAT-APPL-6-053 566 PC **A07**/MF **A01**
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
Environmental Fog/Rain Visual Display System for Aircraft Simulators.
Patent Application,
W. D. Chase. Filed 29 Jun 79, 62p N79-33220/1, NASA-CASE-ARC-11158-1
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A combination of electronic and mechanical integrated elements which operate together are used to produce realistic environmental conditions that would actually be encountered by a pilot flying an aircraft. The electronic elements of the system include a real time digital computer, a calligraphic color display which simulates landing lights of selective intensity, and a color television camera for producing a moving color display of the airport runway as depicted on a model terrain board. The mechanical simulation elements of the system include an environmental chamber which can produce natural fog, nonhomogeneous fog, rain and fog combined, or rain only. A pilot looking through the aircraft windscreen will look through the fog and/or rain generated in the environmental chamber on to a viewing screen with the simulated color image of the airport runway, and observe a very real simulation of actual conditions of a runway as it would appear through actual fog and/or rain.

PAT-APPL-6-055 716 PC **A02**/MF **A01**
Department of the Army Washington DC
Apparatus and Method for Determining Electrical Conductivity of Water Vapor.
Patent Application,
Hugh R. Carlon, and Rex M. Pritt. Filed 9 Jul 79, 14p AD-D006 411/3
Availability: This Government-onwed invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An apparatus and method are disclosed for measuring the conductivity or number of water ion clusters present in a moist air environment. A test chamber is utilized for operatively simultaneously holding a 'dummy' reference cell and a 'large' conductivity cell having substantially the same leakage resistance. The cells are designed to have 'cell factor' ratios substantially different from each other. A D.C. power source with an in series vacuum-tube voltmeter is used to alternately measure the voltage drop of each cell under the similar variable ambient conditions. The conductivity or number of ion cluster present in the test environment is determined by a calculation using voltage compensated values and by graphical extrapolation. (Author)

PAT-APPL-6-078 521 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Pasadena Office, CA.
Precise RF Timing Signal Distribution to Remote Stations.
Patent Application,
G. F. Lutes, Jr. Filed 24 Aug 79, 8p N79-34013/9, NASA-CASE-NPO-14749-1
Contract NAS7-100
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An improved and simplified distribution system is provided for a precise RF reference signal, such as a signal from an H-maser using a light beam from a laser as a frequency carrier, modulating the light beam with the RF timing signal in a modulator, and after distribution to remote stations through optical fibers, demodulating the carrier with an optical detector to detect the RF timing signal. The detected RF reference signal is then processed through an RF detector to provide an automatic gain control (AGC) signal that has an average value proportional to the amplitude of the RF reference signal. This AGC signal is applied to a voltage variable attenuator positioned in front of the RF detector. Since the light frequency is very high, as compared to the RF reference signal, deviation of the reference signal phase is a very small fraction of the RF frequency. In that manner, the timing signal amplitude is maintained constant at each station with substantially zero phase stability degradation.

PAT-APPL-870 694 PC **A02**/MF **A01**
Department of the Army Washington DC
Method and Apparatus for Testing Crystal Elements.
Patent Application,
Arthur Ballto. Filed 19 Jan 78, 24p AD-D006 417/0
Portions of this document are not fully legible.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A method and apparatus are described for determining anomalies in the frequency - or admittance-temperature characteristics of a piezoelectric crystal resonator by inserting a variance capacitance network in series with the crystal and electronically sweeping the value of the capacitance network by a control voltage applied thereto while the temperature remains constant and noting any abrupt change in the resonance frequency characteristics. (Author)

PAT-APPL-959 542 PC **A02**/MF **A01**
Department of the Army Washington DC
Electronic Velocimeter.
Patent Application,
J. Schmidt. Filed 13 Nov 78, 17p AD-D006 419/6
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An electronic velocimeter for measuring the muzzle velocity of a projectile employs a conductive coil mounted between the muzzle and an annular conductive shield. The shield and coil are insulated from each other and encircle the trajectory of the projectile. An oscillator means for generating an oscillator signal is coupled to the coil. This oscillator means is responsive to the projectile passing through the coil. A Timing means responds to the oscillator to produce a timing signal. This timing signal represents the transit time for the projectile to traverse a predetermined interval of the trajectory of the projectile. Knowing this transit time the velocity is readily obtained. (Author)

PAT-APPL-965 955 PC **A02**/MF **A01**
Department of the Army Washington DC
Non-Spill Gas-Liquid Contact Unit.
Patent Application,
Walter A. Steinke. Filed 4 Dec 78, 10p AD-D006 420/4
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A non-spill gas-liquid contact unit for use in a portable detector device for testing the atmosphere for the presence of hazardous substances. The gas-liquid contact unit includes a tubular chamber for absorber liquid, surmounted by a tubular air chamber removably attached thereto by a fluid tight joint, and a breather tube for drawing environmental air through the absorber liquid. The air chamber possesses an axial gas inlet tube projecting from its lower end for admitting gas from the absorber chamber, and an axial gas outlet tube whose one end projects into the upper end of the air chamber and the other end can be connected to a vacuum pump. The air chamber with its inlet and outlet tubes functions as a lock so that, when the unit is accidentally tilted from the normally vertical position to a horizontal or an inverted position while it is under vacuum, the liquid cannot spill out of the unit and thus nullify the analysis and corrode the vacuum pump. (Author)

PATENT-3 190 124 Not available NTIS
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
Bakeable Mcleod Gauge.
Patent,
W. S. Kreisman. Filed 7 Nov 61, patented 22 Jun 65, 6p N79-33450/4, PAT-APPL-150 690
Supersedes PAT-APPL-150 690-61. Subm-Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

A low pressure gauge of the McLeod type demonstrating superior performance and measuring characteristics is described. A mercury reservoir which is kept in a vacuum at all times as well as bakeable glass components to reduce contamination are featured.

PATENT-3 273 376 PC **A02**/MF **A01**
Department of the Navy Washington DC
Static and Dynamic Calibration Vessel for Pressure Gages.
Patent,
Philip M. Aronson, and Robert H. Waser. Filed 30 Oct 64, patented 20 Sep 66, 3p AD-D006 422/0, PAT-APPL-407 936

Supersedes PAT-APPL-407 936-64.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This invention relates to a calibration vessel for pressure gages and more particularly to a calibration device for making static and dynamic calibration tests on pressure gages.

PB80-100878 Not available NTIS
National Bureau of Standards, Washington, DC.
Testing of Water-Heating Collectors According to ASHRAE Standard 93-77.
Final rept.,
J. P. Jenkins, and J. E. Hill. 1978, 8p
Pub. in SUN: Mankind's Future Source of Energy, n2, p1021-1028 1978.

A proposed procedure for testing and rating solar collectors was published by the National Bureau of Standards (NBS) in 1974. In early 1977, the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) adopted ASHRAE Standard 93-77 which is a modified version of the NBS procedure. A test facility for water-heating collectors has been built at NBS in accordance with this Standard. The purpose of this paper is to briefly explain the recently adopted test procedure, describe the NBS test facility, and to give typical test results for collectors commercially available in the United States.

PB80-102759 PC **A03**/MF **A01**
AeroChem Research Labs., Inc., Princeton, NJ.
Mobile Source NOx Monitor, Hydrogen-Atom Direct Chemiluminescence Method.
Final rept. Sep 77-Mar 79,
Arthur Fontijn, Hermann N. Volltrauer, and William R. Frenchu. Jul 79, 43p EPA/600/2-79/120
Contract EPA-68-02-2744

An analyzer was developed for measuring motor vehicle NOx (NO and NO2) emissions based on the chemiluminescence reaction of NO and NO2 with hydrogen atoms. This eliminated the need for an NO2 to NO converter as required with ozone chemiluminescence for NOx analysis. The hydrogen-atom source is based on the thermal dissociation of molecular hydrogen on a hot (approximately 1900C) tungsten filament. The unit has linear response to NOx over a concentration range from 4 ppm to greater than 3000 ppm. No interferences were observed with H2O, CO, CO2, toluene, isopentane, NH3, HCN, CH3NH2, or H2 at concentrations encountered in raw automobile exhaust. Oxygen and ethylene caused minor interferences which should be inconsequential in actual application.

PB80-103898 Not available NTIS
National Bureau of Standards, Washington, DC.
A New Approach to Spectral Radiometry Based on Opto-Electronics.
Final rept.,
J. Geist, M. A. Lind, A. R. Schaefer, and E. F. Zalewski. 1976, 19p
Pub. in Proceedings of the International Symposium of the Technical Committee on Photon-Detectors, Held at Braunschweig (Germany, F.R.), on May 17-21, 1976, p149-167 1976.

Progress in developing a new approach to radiometry based on electro-optical technology is discussed. A feasibility experiment that demonstrates and motivates the new approach is described. The laser-based, characterization facility that plays a central role in the new approach, including the electrically calibrated pyroelectric radiometer that provides the absolute radiant power measurements, and recent investigations of silicon photovoltaic detectors that were performed on the facility are all described. Alternatives for extending the wavelength range of the new approach are also discussed.

PB80-104151 Not available NTIS
National Bureau of Standards, Washington, DC.
Artifacts Observed in Energy-Dispersive X-Ray Spectrometry in the Scanning Electron Microscopy.
Final rept.,
C. E. Fiori, and D. E. Newbury. 1978, 22p
Pub. in Scanning Electron Microsc. I, p401-422 1978.

X-ray spectra obtained with a lithium-drifted silicon detector attached to a scanning electron microscope often contain artifacts which limit the accuracy of qualitative and quantitative analysis. Three categories of artifacts are recognized: (1) artifacts which originate during the physical process of x-ray detection; (2) artifacts associated with the signal processing chain; and (3) artifacts which arise from the environment of the sample and detector.

PB80-104250 Not available NTIS
National Bureau of Standards, Washington, DC.
Techniques for Producing Standard EM Fields from 10 kHz to 10 GHz for Evaluating Radiation Monitors.
Final rept.,
E. B. Larsen. 1979, 17p
Pub. in Proceedings of the Symposium on Electromagnetic Fields in Biological Systems (1978) Held at Ottawa, Canada, on June 28-30, 1978, p96-112 1979.

The approach used at NBS for evaluating rf radiation monitors is to generate a calculable field and then immerse the probe being calibrated in this known field. The optimum instrumentation depends on the frequency and required accuracy. Up to 300 MHz a TEM cell is used, which is a large rectangular 'coaxial' transmission line. At these low frequencies, only the principal wave (TEM mode) propagates through the cell and uniform electromagnetic fields are established. Both E and H field strengths can be calculated in terms of power, plate spacing and the cell characteristic impedance. In the 300 to 1000 MHz range a series of rectangular waveguide transmission lines is used. Power is transmitted through the guide to a matched resistive load. Operation is restricted to the TE sub 10 mode in which the E and H fields can be calculated approximately in terms of the frequency, guide dimensions and power flow. Calibrating fields above 500 MHz are generated in an anechoic chamber by a series of standard-gain pyramidal horns. Intense fields can be produced close to the antenna aperture even with low power transmitters. Simple equations are given for accurately calculating these near-zone fields, as determined empirically from the results of numerical integrations on a computer. The procedure involves a simple computation of the intensity produced by an in-phase aperture and then using algebraic equations to calculate near-zone correction factors. These gain reduction factors depend on frequency, horn dimensions and the distance to the field point. The above approach was checked experimentally and the worst case disagreement was 0.5 dB.

PB80-104334 Not available NTIS
National Bureau of Standards, Washington, DC.
NBS Radiation Measurement Assurance Activities.
Final rept.,
E. H. Eisenhower. Apr 77, 7p
Pub. in HEW Publication (FDA) 77-8021, p391-397, Apr 77.

The role of the National Bureau of Standards as the national reference laboratory for radiation measurements is described, as well as the organizational structure and concepts for measurement traceability. Present NBS radiation measurement assurance programs are described briefly. Intended future measurement assurance activities are described generally, particularly those of interest to state radiation control programs.

PB80-104375 Not available NTIS
National Bureau of Standards, Washington, DC.
A Convenient Standard for Low-Field Susceptibility Calibration.
Final rept.,
J. Rosenbaum, E. Larson, R. Hoblitt, and F. R. Fickett. Aug 79, 3p
Pub. in Review of Scientific Instruments 50, n8, p1027-1029, Aug 79.

Finely ground mixtures of magnetic iron oxide and glass provide a convenient calibration standard of moderate accuracy (approximately 5%) for low-field (<0.5 kA/m) magnetic susceptibility measurements. The use of powders allows fabrication of standards of nearly any shape and size. For our mixtures, which range from 0.063 to 11.8% iron oxide by weight, the susceptibility values vary from 2.65 x 10 to the minus 7 power to 5.77 x 0.0000577 cu m/kg, and are nearly linear with iron oxide concentration.

PB80-104425 Not available NTIS
National Bureau of Standards, Washington, DC.
Design of an Extended-Range, Three-Wavelength Distance-Measuring Instrument.
Final rept.,
S. E. Moody, and J. Levine. 1979, 6p
Grant NsG-7344
Pub. in Tectonophysics 52, p77-82 1979.

The report describe an extension of current multiwavelength Electromagnetic Distance Measurement (EDM) techniques which should allow the range of multiwavelength measurements to be extended to approximately 50 km. The basic modification needed is the replacement of the retro-reflector commonly used by an active station containing lasers and a microwave source. Because the system will always be operated as a full three-wave-length instrument, accuracies of about 5 x 10 to the minus 8th power at 50 km should be obtainable on a routine basis under reasonably clear weather conditions.

PB80-104508 Not available NTIS
National Bureau of Standards, Washington, DC.
Relationships Between the Performance of Time/Frequency Standards and Navigation/Communication Systems.
Final rept.,
H. Hellwig, S. R. Stein, F. L. Walls, and A. Kahan. 1979, 15p
Pub. in Proceedings of the Precision Time and Time Interval Planning Meeting (10th) Held at Washington, DC. on November 28, 1978, p37-51 1979.

The paper discusses the relationship between system performance and clock or oscillator performance. Our approach will be basic, pointing out some tradeoffs such as short term stability versus bandwidth requirements; frequency accuracy versus signal acquisition time; flicker of frequency and drift versus resynchronization time; frequency precision versus communications traffic volume; spectral purity versus bit error rate, and frequency standard stability versus frequency selection and adjustability. Our aim is to give the system designer and manager a better grasp of the benefits and tradeoffs of using precise frequency and time signals at various levels of precision and accuracy.

PB80-802192 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Nondestructive Testing: X-ray Photography and Radiography (Citations from the NTIS Data Base).
Rept. for 1964-Sep 79,
William E. Reed. Dec 79, 287p
Supersedes NTIS/PS-78/1058, NTIS/PS-77/0908, NTIS/PS-76/0780, and NTIS/PS-75/666. For the companion Published Searches of the Engineering Index Data Base, see NTIS/PS-77/0909 and PB80-802200.

Federally-sponsored research and foreign reports covering techniques, equipment, and applications are cited. Applications include flaw detection, fatigue determination, inspection of joints, and measurement of mechanical and physical properties. (This updated bibliography contains 278 abstracts, 30 of which are new entries to the previous edition.)

PB80-802200 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Nondestructive Testing: X-ray Photography and Radiography. Volume 2. August, 1976-September, 1979 (Citations from the Engineering Index Data Base).
Rept. for Aug 76-Sep 79,
William E. Reed. Dec 79, 284p
Supersedes NTIS/PS-78/1059, NTIS/PS-77/0910 and NTIS/PS-76/0781. For the companion

Published Search of the NTIS Data Base, see PB80-802192. See also Volume 1, 1970-July, 1976, NTIS/PS-77/0909.

The bibliography cites reports from worldwide research covering techniques, equipment, and applications. Applications include flaw detection, fatigue determination, inspection of joints, quality control, and measurement of mechanical and physical properties. (This updated bibliography contains 277 abstracts, 94 of which are new entries to the previous edition.)

UCRL-82408 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Full Surface Examination of Small Spheres with a Computer Controlled Scanning Electron Microscope.
C. M. Ward, D. L. Willenborg, and K. L. Montgomery. 28 Feb 79, 11p CONF-790813-4
Contract W-7405-ENG-48
14. annual meeting of the Microbeam Analysis Society, San Antonio, TX, USA, 13 Aug 1979.

This report discusses a computer automated stage and Scanning Electron Microscopy (SEM) system for detecting defects in glass spheres for inertial confinement laser fusion experiments. This system detects submicron defects and permits inclusion of acceptable spheres in targets after examination. The stage used to examine and manipulate the spheres through 4 pi steradians is described. Primary image recording is made on a roster scanning video disc. The need for SEM stability and methods of achieving it are discussed. (ERA citation 04:051189)

14D. Reliability

IDO-1570-T14 PC **A04**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
Estimators for the Binomial Failures Rate Common-Cause Model.
C. L. Atwood. 1979, 57p
Contract EY-76-C-07-1570

In Vesely's binomial failure rate model, a system of m components is hit by random shocks which may cause components simultaneously to fail, each component with equal probability. Individual components may also fail when no shock has occured. The data possibilities considered are those causes of single failures that are identifiable (as shock or not) or not identifiable. Given data from such a system, non-Bayesian and Bayesian point and interval estimators are found for the various quantitites of interest. Residual analyses and hypothesis tests are presented for checking the model assumptions. An example is worked out. (ERA citation 04:050048)

14E. Reprography

AD-A075 686/6 PC **A02**/MF **A01**
Vanderbilt Univ Nashville Tenn
System for Generating Dynamic Random-Element Stereograms.
Technical rept.,
Sudhakar S. Shetty , Arthur J. Brodersen , and Robert Fox. Sep 79, 24p Rept no. N14-1101-79C-0003
Contract N00014-76-C-1101

Truly dynamic stereograms can be generated by a new system that produces an anaglyphic display on a commercial television receiver. Location, size, and disparity (both direction and magnitude) of the stereographic form are controlled by means of a TTL unit. (Author)

AD-A075 873/0 PC **A03**/MF **A01**
Ohio State Univ Research Foundation Columbus Mapping and Charting Research Lab
Exterior Orientation of Near-Vertical Aerial Photographs--Computational Procedure and Illustrated Examples.
Technical paper,
Vernon A. Rybski. Feb 52, 32p MRCL-TP-156, WADC-TR-52-95
Contract AF 18(600)-90

An analytical method of determining the exterior orientation of a near-vertical photograph is described. The theory, computing procedure, tests results, and sample computations using fictitious photographs are presented. It is concluded that the method is rapid and meets practical accuracy needs for photographs containing tilts up to three degrees. (Author)

AD-A076 203/9 PC **A04**/MF **A01**
Army Engineer Topographic Labs Fort Belvoir Va
Materials Research for Holographic Recording. Report Number 3. Hardened Gelatin Holographic Recording Materials.
Technical rept.,
James W. Gladden , and John W. Eastes. Sep 79, 69p Rept no. ETL-0197
See also report no. 1, AD-A035 457.

The results of a study of four different hardened gelatin holographic recording materials are reported. These are the dichromated, diazo, diazo resin, and silver halide (sensitized) gelatins. The report concludes that of the four photosensitive processes studied, the silver halide (sensitized) gelatin process offers the most promising process characteristics. The silver halide gelatin process is a new holographic recording process that can be used toprepare phase volume holograms in hardened gelatin. The process uses a reversal bleach that dissolves the developed silver metal image while further crosslinking the gelatin in the vicinity of the silver image. Upon fixing and with dehydration of the resulting gelatin hologram, one obtains recordings similar to those produced by the dichromated gelatin process. This is accomplish with exposures on the order of 200 to 500 micron J/sq cm at 514.5 nm in a silver halide emulsion that has a panchromatic response. Furthermore, because the hologram has no silver halide present, the holgoram does not exhibit the printout phenomena characteristic of bleached holograms. (Author)

AD-A076 340/9 PC **A03**/MF **A01**
Air Force Avionics Lab Wright-Patterson AFB Oh
Tri-Bar Reading Correction for Oblique Imagery.
Final rept. Dec 78-Jul 79,
Edward L. Gliatti , and Thomas Stanzione. Jul 79, 38p Rept no. AFAL-TR-79-1171

Tri-Bar resolution targets are geometrically distorted when photographed at oblique angles. One of the effects of this distortion is the changing of the aspect (length to width) ratio of the bars. Targets parallel to the line of flight (crossline) at large oblique angles to nadir of the aircraft produce images with apparent increased aspect ratios due to the foreshortening of the bar/space width. Perpendicular targets to the flight direction (inline) at an oblique angle have their lengths foreshortened, thus reducing the aspect ratios. At 70 deg, original 5:1 aspect ratio tri-bar targets have apparent ratios of 14.6:1 crossline and 1.71:1 inline. A laboratory experiment was set up to simulating oblique imagery to determine what effects the changing aspect ratio has on the accuracy of tri-bar readings, after the insertion of normal geometrical corrections. Different target contrast ratios, target orientations, and cameras were used. Analysis of variance showed that for crossline targets, resolution readings corrected by the normal cosine geometrical factor provide accurate results for any constrast ratio or target orientation.

PATENT-4 153 917 PC **A02**/MF **A01**
Department of the Navy Washington DC
Image Stabilizer System for Stop-Action Playback.
Patent,
Paul S. Catano, Michael A. Monaham, and Keith Bromley. Filed 23 Jan 78, patented 8 May 79, 9p AD-D006 424/6, PAT-APPL-871 313
Supersedes PAT- PPL-871 313-78, AD-D004 728.
Availability: This Government-onwed invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Light energy data is generated in sequential interlaced field raster format by a sensor driven in azimuth to detect a panoramic scene. The light energy data is sequentially recorded together with an azimuth rate signal which is a function of the rate that the sensor is driven in azimuth. Because the sensor has been driven in azimuth, however, there is a delay in the sequential detection between first and second interlaced fields of any selected frame of the panoramic scene; consequently, when it is desired to retrieve and playback a 'stop-action' image comprised of a selected frame, compensation must be made for the delay. The recorded azimuth rate signal is used to develop a commensurate delay between the two sequential first and second interlaced fields of ligh energy data comprising the selected frame of light energy data which is desired to playback in 'stop-action' form.

15. MILITARY SCIENCES

15A. Antisubmarine Warfare

AD-A075 840/9 PC **A04**/MF **A01**
Naval War Coll Newport R I
Military Use of Offshore Platforms.
Research paper,
S. R. Arends , J. H. Harrington , C. R. Karlsson , A. E. Pellerin , and M. M. Staley. 9 Apr 79, 62p

A feasibility study as to the possible use of offshore oil platforms as operating bases for Anti-Submarine Warfare (ASW) helicopters and/or as sensor stations in a sea lines of communication/sea surveillance mission. The capability of existing platforms is investigated as to their physical properties to support such operations, their locations, and possible political and legal problems that may impact the military use. The platforms are found to be capable of supporting an ASW/sea surveillance mission but legal constraints and the location of existing platforms could limit such use to U.S. coastal waters. Examination of the feasibility of the mission for and compatibility with the operation of Naval Air Reserve ASW Helicopter Squadrons indicates that these squadrons could conduct detachment size operations from the offshore platforms, during peacetime for training and wartime mobilization to provide ASW/sea surveillance missions for protection of U.S. coastal waters. (Author)

15B. Chemical, Biological, and Radiological Warfare

AD-A075 654/4 PC **A06**/MF **A01**
Cochrane (Rexmond C) Edgewood Arsenal Md
Gas Warfare in World War I: The 79th Division at Montfaucon, October 1918.
Rexmond C. Cochrane. Aug 60, 101p Rept no. STUDY-19
Contract DA-18-108-cml-6214

This is a tentative study of the gas experience of the 79th Division at Montfaucon during World War I. This study is not presented as a definitive and official history, but is reproduced for current reference use within the Military Establishment pending the publication of an approved history. (Author)

AD-A075 655/1 PC **A05**/MF **A01**
Cochrane (Rexmond C) Edgewood Arsenal Md
Gas Warfare in World War I: The 42nd Division Before Landres-et-St. Georges, October 1918.
Rexmond C. Cochrane. Mar 60, 94p Rept no. STUDY-17
Contract DA-18-108-cml-6214

This is a tentative study of the gas experience of the 42nd Division during World War I. This study is not presented as a definitive and official history, but is reproduced for current reference use within the Military Establishment pending the publication of an approved history. (Author)

AD-A075 722/9 PC **A09**/MF **A01**
Army Medical Intelligence and Information Agency Fort Detrick MD
C-Weapons (Characteristics and Defense) (C-Stridsmedlen Egenskaper Och Skydd).
Nils Forsman , Harold Frostling , Ola Hertzberg , Bo Jansson , and Lennard Larsson. 23 Aug 79, 181p Rept no. USAMIIA-HT-010-79
Trans. of unidentified Swedish language periodical p1-180.

No abstract available.

15C. Defense

AD-A075 716/1 PC **A05**/MF **A01**
Army Infantry School Fort Benning Ga
Fundamentals of Defensive Combat and Retrograde Operations.
1962, 92p
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

No abstract available.

AD-A075 940/7 PC **A03**/MF **A01**
General Research Corp Mclean Va Operations Analysis Group
Improvement of NATO Reserves,
Irving Heymont. Oct 79, 45p Rept no. GRC-1105-01-79-CR
Contract MDA903-79-C-0371

An analysis of the Netherlands Army Reserve system known as RIM and its applicability to the Belgian and Federal Republic of Germany armies. (RIM is the Dutch acronym for 'Rechstreeks Instromend Mobilizabele eenheden' loosely translated as 'direct intake of mobilizable (reserve) units.')

AD-A076 120/5 PC **A03**/MF **A01**
Academy for Interscience Methodology Chicago Il
Final Report on Contract N00014-78-C-0033.
Rept. for 1 Oct 78-30 Sep 79,
Adelaide E. Bialek , Merl L. Kardatzke , Leo R. Katzenstein , and Norman H. Painter. Aug 79, 39p Rept no. AIM-79-T-5
Contract N00014-78-C-0033

Contents: The Force Mix Model -- Organizing Concepts, Damage to Soft Target Types, Using Perfect Weapon Functions for Imperfect Weapons, and Model Efficiency Research; Barriers to Cruise Missile Routes -- Statement of the Problem, Mathematical Solution, Computation Considerations, Numerical Defense, and Overview of Subroutine BAR; DGZ's for Multiple Weapon Systems; and Navy Study Support.

AD-A076 328/4 PC **A06**/MF **A01**
Army Command and General Staff Coll Fort Leavenworth Ks
The New England Colonial Militia and its English Heritage: 1620-1675.
Final rept.,
Martin W. Andresen. 8 Jun 79, 102p
Master's thesis.

The threefold purpose of this thesis is to examine the evolution of the Plymouth and Massachusetts Bay militias in relationship to the English militia; to trace their establishment in colonial law; and to describe how a changing New World environment altered the colonial militias during the period 1620-1675.

PB80-106537 PC **A04**/MF **A01**
General Accounting Office, Washington, DC. Procurement and Systems Acquistion Div.
Impediments to Reducing the Costs of Weapon Systems.
Report to the Congress.
8 Nov 79, 55p PSAD-80-6

Major weapons' cost growth since World War II far exceeds the rate of inflation, and no relief is in sight. Various Department of Defense efforts to restrain costs are worthwhile, but unlikely to achieve really substantial cost reductions. The rising costs have reduced the quantities of weapons produced and widened the U.S. forces' numerical disadvantage with the Soviet arsenal. Many complex factors contribute to high costs; however, the military's desire for maximum performance, high-technology weapon systems together with congressional funding instability and constraints are the major cost drivers. Military and political considerations may prevent fundamental changes, but GAO makes recommendations that could relieve the cost problem.

PB80-801780 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Intrusion and Weapon Detection: Crime Prevention (Citations from the NTIS Data Base).
Rept. for 1964-Nov 79,
Guy E. Habercom, Jr. Dec 79, 110p
Supersedes NTIS/PS-78/1227, NTIS/PS-77/1104, NTIS/PS-76/0965, and NTIS/PS-75/809. For the companion Published Search of the Engineering Index Data Base, see PB80-801798.

Personnel and weapon detection methods are investigated in these Government-sponsored research reports. Metal detection of guns, antiintrusion devices, (e.g., burglar alarms, trip wires, etc.) and nuclear security are among the topics reviewed. Some of the reports are relative to military applications but could conceivably find civilian uses. (This updated bibliography contains 101 abstracts, 4 of which are new entries to the previous edition.)

PB80-801798 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Intrusion and Weapon Detection: Crime Prevention (Citations from the Engineering Index Data Base).
Rept. for 1970-Nov 79,
Guy E. Habercom, Jr. Dec 79, 114p
Supersedes NTIS/PS-78/1228, NTIS/PS-77/1105 and NTIS/PS-76/0966. For the companion Published Search of the NTIS Data Base, see PB80-801780.

Personnel and weapon detection methods are investigated in these research reports gathered in a worldwide literature survey. Metal detection of guns, anti-intrusion devices (e.g., burglar alarms, trip wires, etc.) and nuclear security are among the topics reviewed. Some of the reports are relative to military applications but could conceivably find civilian use. (This updated bibliography contains 107 abstracts, 12 of which are new entries to the previous edition.)

15D. Intelligence

AD-A076 031/4 MF **A01**
Wright Air Development Center Wright-Patterson AFB Oh
Comparison of Sensitized Materials for Aerial Reconnaissance.
Technical rept.,
William Mallios. Sep 52, 25p Rept no. WADC-TR-52-200
Availability: Microfiche copies only.

With the exception of hydrographic, geological, and forestry studies, black-and-white film is the overwhelming choice of photo interpreters as a source of aerial photographic intelligence. For certain specific purposes,however, color film and camouflage detection film are superior soucres of information. Unfamiliarity of the interpreters with color and camouflage detection films exerts more influence on the film choices than the actual values and qualities of the films themselves. Lack of proper viewing equipment, with special regard to stereo, was an equally strong influencing factor on these choices. Recommendations are made that more instruction be made available through the photo interpretation schools and that more and better equipment be made available for their use, all of which should be specifically aimed at special-purpose films. (Author)

AD-A076 314/4 PC **A06**/MF **A01**
Naval War Coll Newport Ri Center for Advanced Research
USN-USAF Interaction for Ocean Surface Surveillance Using Land-Based Aircraft,
John R. Thompson. Jun 79, 115p

A study of USN-USAF interaction for the ocean surveillance role is conducted to consolidate fact and opinion concerning coordination issues. Selected USAF aircraft (B-52, FB-111, F-111, RC-135, C-130) are compared with the USN P-3 and are found to be capable of certain surveillance functions and likely to be available for the surveillance role through a range of world situations. Recommendations for methods to overcome restrictive organizational conditions include creation of a small joint Navy-Air Force agency to translate established policy into effective operational procedures. (Author)

AD-A076 316/9 MF **A01**
Technical Operations Inc Alexandria Va Combat Operations Research Group
Some Types and Distributions of Intelligence Errors.
Memorandum rept.,
James Hodgson. 30 Jan 58, 33p Rept no. CORG-M-67
Availability: Microfiche copies only.

The analysis presented in this memorandum illustrates some of the manifold errors in military intelligence. The data are drawn from the actions of V US Corps in Normandy, France, between 6 and 13 June and on 30 June 1944. Reliable statistical inferences cannot be drawn because of the paucity of material collected in the allotted time. The investigation consisted of an historical reconstruction of the actual German situation in Normandy, collection of available data from V Corps G2 records concerning the enemy, and statistical analysis of the matched data. The statistical analysis indicates that there is a significant difference between the frequency of error from one day to the next. The implications of the data seem to reinforce common sense and military experience; that is, if a retreating enemy breaks contact, it is difficult to know what action he is taking. The data of this study indicate that the frequency with which elements of units are identified as entire units and the frequency with which units are thought to be other units rises sharply when contact is broken or relaxed.

15E. Logistics

AD-A075 712/0 PC **A08**/MF **A01**
Quartermaster Field Evaluation Agency Fort Lee Va
Abstract Bibliography: Technical Reports Published Fiscal Year 1959.
1959, 168p

This mission of the Field Evaluation Agency, a major subordinate element of the Quartermaster Research and Engineering Command, includes: (1) Field evaluations, including surveys, engineering and user tests, of Quartermaster Corps material, systems and techiques; (2) Research for the development of new and improved field test methodology; (3) Development of methods, techniques and procedures for the aerial delivery of Army materiel; and (4) provision of technical services and logistical support to other elements of Quartermaster Research and Engineering Command and the Quartermaster Corps. This bibliography, which is a compilation of the Agency's accomplishments during the past fiscal year, contains abstracts of the bound technical reports published and a listing of other reports forwarded. The reports are cross-referenced by test number, project area number, and title.

AD-A075 808/6 PC **A04**/MF **A01**
Army Armament Materiel Readiness Command Rock Island Il Program Analysis and Evaluation Directorate
Program Analysis and Evaluation Directorate Activities Summary.
Final rept.
Sep 79, 58p Rept no. DRSAR/PE/N-82

This report contains Memoranda for Record (MFR's) that summarize activities of the Program Analysis and Evaluation Directorate, US Army Armament Materiel Readiness Command, Rock Island, IL 61299. Subjects dealt with are: Cost Impact of Increased Procurement Lead Times for Secondary Items; Calculating Evaporation Rates from Chemical Agent Spills; Ammunition Requirements Terminology; Continuous-Process Facilities Cost as a 2/3 Power Function of Capacity; TDP's of $2500 and less. (Author)

AD-A075 832/6 PC **A05**/MF **A01**
Brown Univ Providence Ri Dept of Computer Science
Future Technical Documentation Delivery Systems for Naval Maintenance and Repair.
Final rept. 1 Apr 78-30 Sep 79,
Robert F. Gurwitz , Steven K. Feiner , Read T. Fleming , and Andries van Dam. 27 Sep 79, 86p
Contract N00014-78-C-0396

This report describes the facilities that could be provided by a portable, microcomputer-based system for the delivery of maintenance and repair

technical documentation in the Navy of the 1990's. It includes a comparison of existing documentation media (paper, microfiche, and audio-visual materials), emphasizing desirable features that should be preserved, and defects that should be overcome. A technology estimate is presented which extrapolates from presently available technology, indicating where further research needs to be done. The formats currently employed for Navy technical documentation and the maintenance and repair pipelines that are followed in its production and use are reviewed in an appendix. (Author)

AD-A075 939/9 MF **A01**
Office of Naval Research Arlington Va
Naval Research Logistics Quarterly. Volume 26, Number 3.
Sep 79, 169p
See also Volume 26, Number 2.
Availability: Superintendent of Documents, GPO, Washington, DC 20402 HC$3.50. Microfiche furnished to DTIC (and NTIS) users.

Partial Contents: The Next Decade of Logistics Research; Geometry of the Total Time on Test Transform; Simulation of Nonhomogeneous Poisson Processes by Thinning; Bounds on Optimal Cost for a Replacement Problem with Partial Observations; Survival Distributions in Crossing Fields Containing Clusters of Mines with Possible Detection and Uncertain Activation or Kill; Asymptotic Distribution of Order Statistics; Nonextreme Point Solution Strategies for Linear Programs; Design of a Process Control Scheme for Defects per 100 Units Based on AOQL; Single Server Queue with Arrival Rate Dependent on Server Breakdowns; Comparison of Waiting Time Approximations in Series Queuing Systems; Statistical Tests for Exponential Services from M/G/1 Waiting-Time Data; Scheduling Jobs to Two Machines Subject to Batch Arrival Ordering; and Scheduling of Stochastic Tasks on Two Parallel Processors.

AD-A076 136/1 PC **A02**/MF **A01**
Frank J Seiler Research Lab United States Air Force Academy Co
Cargo Generation Forecasting Models.
John S. Brush. Oct 79, 10p Rept no. FJSRL-TR-79-0010

Time series models of daily cargo generated for two MAC channels are developed. The strong weekly cyclical fluctuation is exploited in developing forecasting models using both past cargo generation and past cargo arrivals as inputs. (Author)

AD-A076 158/5 PC **A06**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Engineering
A Critical Appraisal of Source Selection Procedures.
Master's thesis,
John N. Milligan. Sep 79, 104p Rept no. AFIT/GSM/SM/79S-10

Multiple linear regression techniques were employed to examine source selection in an Air Force procurement division. The experimental data was derived from an exercise which examined a part of the source selection process. Each exercise contained identical Request for Proposals. Subjects were asked to rate proposals with and without a policy (prioritizing evaluation criteria). The results of the exercise were grouped three ways: (1) by organization, (2) by supervisory level, and (3) by experience with source selection. All possible pairings within the above three categories were then compared to identify any significant differences between sub-category members. All groupings were investigated to determine whether or not each evaluation criteria contributed significantly to the rating a proposal received. Assimilation of the policy (prioritizing evaluation criteria) was examined. Last, the linear model was compared to a non-linear model to determine whether or not the linear model was adequate. The results suggest that source selection decisions are not similar across organizations within the Air Force division. Furthermore, subjects did not utilize all the information available to them in making decisions. People often chose to utilize only a part of the available information in arriving at a decision.

AD-A076 159/3 PC **A06**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB Oh School of Engineering
Leader/Follower: An Analysis of a Proposed Technique for Increasing Competition in Air Force Weapon System Procurements.
Master's thesis,
Larry L. Soderquist. Sep 79, 115p Rept no. AFIT/GSM/SM/79S-13

A comprehensive model for applying the leader/follower procurement technique to introduce competition into the system acquisition process is presented in this research effort. A comparative analysis of three procurement techniques (second sourcing, technology licensing, and leader/follower) is presented to determine the factors that must be exhibited by a system before an acquisition program can be adapted to the leader/follower procurement technique. A total of twelve factors are identified. The Air Force High Technology Ejection Seat (ACES II) acquisition program is analyzed to determine what factors were considered while this program was adapted to the leader/follower procurement technique. Two additional factors are identified.

AD-A076 305/2 PC **A04**/MF **A01**
Arinc Research Corp Annapolis Md
User's Manual. AMP Implementation and Tracking System.
Final rept.,
J. Bailey , S. Cotton , and N. Steele. Oct 79, 74p Rept no. 1750-01-3-2053
Contract F33657-79-C-0567

This report presents a user-oriented description of a data base architecture designed to assist in the implementation and tracking of the Avionics Master Plan (AMP). (Author)

AD-A076 327/6 PC **A07**/MF **A01**
Army Command and General Staff Coll Fort Leavenworth Ks
The Impact of the All-Volunteer Force on Physician Procurement and Retention in the Army Medical Department, 1973-1978.
Final rept.,
Paul P. Brooke, Jr. 8 Jun 79, 142p
Master's thesis.

This study analyzes the planning which occured and the provisions of the major personnel procurement programs which were established to recruit and retain physicians in the All-Volunteer Army. The investigation is focused on an evaluation of the effectiveness of these procurement programs during the period 1973-1978 and an analysis of the reasons for program performance during the period studied. An assessment of the ability of the All-Volunteer Army to attract and retain sufficient physicians to accomplish its mission is offered. Primary research methodology consits of an extensive review of Congressional testimony concerning the thesis topic during the period 1972 through 1978, and a comparison of this testimony over a period of time. A review of pertinent military and civilian literature is provided. The research reveals that during its first five years of existence, the all-volunteer force experiment has had a seriously negative impact on Army medical officer procurement. Fundamental flaws in military physician procurement and retention programs, compounded by inconsistent as well as poorly-timed efforts to remedy them have significantly hindered optimum program effectiveness.

15F. Nuclear Warfare

AD-A076 026/4 PC **A08**/MF **A01**
IIT Research Inst Chicago Il
Survivability in a Nuclear Weapon Environment.
Final rept. 30 Sep 77-30 Apr 79,
A. Longinow. May 79, 161p Rept no. IITRI-J6427-F
Contract DCPA01-77-C-0229

This report contains information on protective capabilities of a variety of different personnel shelters against prompt effects of nuclear weapons. This information was collected from previous studies performed for DCPA in this subject area. Protective capabilities are expressed in terms of 'people survivability functions' which relate the probability of survival (or percent survivors) to the free field overpressure at the shelter site. Respective shelters are described in terms of their geometry and material properties. The following shelter categories are included. (1) Existing Engineered Buildings (Upper Stories and Basements), (2) Designed Basements, (3) Single-Purpose Shelters, (4) Dual-Purpose Shelters, (5) Expedient and Special Purpose Shelters and (6) Expediently Upgraded Shelters.

15G. Operations, Strategy, and Tactics

AD-A075 664/3 PC **A02**/MF **A01**
Army (3rd) Fort Mcpherson Ga
Typical Crimes on Third Army Posts: Case Studies. A Commander's Tool for Crime Prevention through Command Information.
1972, 16p

No abstract available.

AD-A075 704/7 PC **A11**/MF **A01**
Army Infantry School Fort Benning Ga
Selected Readings in Guerrilla and Counterguerrilla Operations.
Jul 67, 229p

This handbook is a guide and reference for the student studying guerrilla and counterguerrilla operations at the United States Army Infantry School. Its scope of coverage primiarily concerns itself with Infantry units of Brigade and Battalion size. (Author)

AD-A075 718/7 PC **A04**/MF **A01**
Army Military History Research Collection Carlisle Barracks Pa
Manuscript Holdings of the Military History Research Collection.
Special bibliographic series no. 6, Part 1,
Richard J. Sommers. Aug 72, 64p

The U.S. Army Military History Research Collection has a large and rapidly expanding manuscript collection. It covers the entire range of American military history from colonial times to the present. The Civil War, the Indian Wars, the Spanish-American War, the Philippine Insurrection, and the mid-Twentieth Century period are especially well represented. Many present-day and recently retired officers have deposited their papers here. Some of these generals have also recorded their reminiscences and reflections as part of the 'Senior Officers Debriefing Program'; transcripts of these recollections are available. Most of this manuscript material necessarily relates to regular and volunteer land forces of the United States. A few holdings, however, do pertain to the Coast Guard, Navy, Marines, and various air services. Some also deal with non-American forces and conflicts. A few, moreover, concern civilians caught up in the midst of war. This bibliography describes approximately 52% of present holdings.

AD-A075 719/5 PC **A06**/MF **A01**
Army Military History Research Collection Carlisle Barracks Pa
The Mexican War: A Military History Research Collection Bibliography.
Special bibliographic series no. 7, 1835-1850,
Elizabeth R. Snoke. Apr 73, 115p

This bibliography differs from the previous publications in this series since it concerns a specific time in American history, the Mexican War period from 1835 to 1850. From a military standpoint, the victorious efforts of American military forces can be considered as the proving ground for the Army and the Navy that emerged during the Civil War. The annexation of Texas and the acquisition of lands from Mexico predestined both the expansion of the United States to the Pacific and the conflict which divided brother from brother. This bibliography lists pertinent materials to be found in the Military History Research Collection related to this part of American history and is not intended to be a definite listing of bibliographic references on the period.

AD-A075 892/0 PC **A03**/MF **A01**
Naval War Coll Newport Ri Center for Advanced Research

Naval Force Sizing: Zero-Based or 'Bottoms-Up' Method.
Final rept.,
David F. Walsh. Jun 79, 36p

Decisions about the size of a military force are made in a very complex political and economic environment. This paper tries to bring the focus back to basics. In an unclassified context, using the laws of physics and current best estimate of a wartime scenario, it demonstrates the aggregate of considerations to determine the required size of naval force. It briefly applies contemporary risk theory to the difference between the required naval force and one that is fiscally constrained. (Author)

AD-A075 970/4 PC **A08**/MF **A01**
Perceptronics Inc Woodland Hills Calif
Development of a Decision Taxonomy for the Marine Command and Control Environment. Volume I.
Annual technical rept. 1 Jul 78-30 Jun 79,
Alain Crolotte , and Joseph Saleh. Jun 79, 168p
Rept no. PATR-1069-79-6-VOL-1
Contract N00014-78-C-0495
See also Volume 2, AD-A075 971.

A decision aid selection methodology for the Marine Amphibious Brigade (MAB) decision making environment is presented. Built around a three-way taxonomy, the methodology allows the user to define a degree of merit for each decision aid with respect to a given decision situation. The MAB decision-making environment is first analyzed and the decision tasks pertaining to this environment identified. Decision tasks are then classified along three sets of descriptors: (1) information requirements, (2) attributes, and (3) functional requirements. Clusters of decision tasks with common characteristics are identified which leads to the MAB decision task taxonomy. Decision maker characteristics are identified, and the characteristics of potential MAB decision makers are analyzed, yielding the MAB decision maker taxonomy. The main finding is that decision aids cannot be tailored for individual decision makers, but rather should be adaptive to a number of decision-maker characteristics. Decision task taxonomy and decision maker taxonomy together constitute the decision situation taxonomy. The methodology gives a specific procedure for calculating the degree of merit of a decision aid with respect to a given decision situation. By dividing this degree of merit by the decision aid cost, a cost benefit measure for each decision aid is computed.

AD-A075 971/2 MF **A01**
Perceptronics Inc Woodland Hills Calif
Development of a Decision Taxonomy for the Marine Command and Control Environment. Volume II. Supplement MAB Decision Task Analysis.
Annual technical rept.,
Alain Crolotte , and Joseph Saleh. Jun 79, 66p
Rept no. PATR-1069-79-6-VOL-2
Contract N00014-78-C-0495
See also Volume 1, AD-A075 970.
Availability: Microfiche copies only.

This supplement to report PATR-1069-79-6 (Development of a Decision Taxonomy for the Marine Command and Control Environment) summarizes the findings of the MAB decision-task classification process performed in support of the decision task taxonomy phase. It provides for each MAB decision task the information requirements, functional requirements and attribute values.

AD-A076 156/9 PC **A06**/MF **A01**
Army Military Personnel Center Alexandria Va
A Linear Programming Model to Determine the Least-Cost Transportation Asset Mix to Deploy a Field Artillery Battery.
Final rept.,
John Moody House. 13 Dec 79, 124p
Master's thesis.

An integer programming model is developed to determine the mix of transporting vehicles required to deploy a field artillery battery and minimize the cost associated with the movement. Constraints include the equipment transported, carriers available, deployment time, maximum train length, and rail motive power. The decision variables are the feasible load plans based on equipment and cargo compartment dimensions and carrier payload restrictions. Motor transportation appears to be the optimal mode to minimize transportation costs when time permits. (Author)

AD-A076 180/9 PC **A07**/MF **A01**
Army Command and General Staff Coll Fort Leavenworth Ks
Tactics of the Soviet Army Regiment.
Final rept.,
Bruce Conroy. 14 May 79, 144p
Master's thesis.

This research project is designed to facilitate an understanding of Soviet tactics at the regimental level and below and to draw attention to material available for additional study of Soviet tactics. This paper is the result of analyzing numerous primary and secondary sources to ascertain which forms of tactics the Soviets use and which forms we, as US authors, say they use. A review of recent Soviet tactical exercises was used to confirm their implementation of espoused tactical doctrine. The meeting engagement, the offense, the defense, and the withdrawal are the forms of tactics. A chapter is devoted to each form and possible implementation under given circumstances if postulated. Organization for combat and necessary support elements are included to serve as an aid to wargamers. (Author)

AD-A076 184/1 PC **A06**/MF **A01**
Army Command and General Staff Coll Fort Leavenworth KS
Radar Detection Models in Computer Supported Naval War Games.
Final rept.,
Francis C. Riley, Jr. 8 Jun 79, 107p
Master's thesis.

The purpose of this paper was threefold. First to introduce basic pulse modulated radar theory while concurrently identifying those analytically descriptive parameters and environmental factors which should be considered in realistic radar detection models. Second, to evaluate the adequacy of the radar detection models found in current and planned computerized naval war games with tactical applications. And finally, if satisfactory radar detection models did not exist in those games, then to suggest a suitable model. Each of the paper's three research objectives was achieved. Since none of the radar detection models satisfactorily addressed radar radiation patterns a model was proposed based on a software package developed at the Naval Research Laboratory. In addition, during the course of the research for this paper a requirement for the effective centralized management of computer supported war games development in the U.S. Navy was perceived. (Author)

AD-A076 188/2 PC **A06**/MF **A01**
Army Command and General Staff Coll Fort Leavenworth Ks
The Aerial Fire Support Team.
Final rept.,
Jim S. Hutchinson. 8 Jun 79, 123p
Master's thesis.

This study is a conceptual paper which addresses the advantages of simultaneously employing multiple types of fire support means to include field artillery, close air support, and attack helicopters against an armored threat. It examines advances in weapon systems that will be available by 1985 and their employment in the concept. The Aerial Fire Support Team (AFIST) is based on the fundamental of the combined arms team but with emphasis on fire support. Its purpose is to increase the overall effectiveness of fire support to the maneuver commander. AFIST works on the principle of centralized control and decentralized execution. This is accomplished by the introduction of an aerial fire support coordination center (AFISC) whose primary purpose is to control and coordinate all fire support assets to include attack helicopters. The center's design has it manned and equipped to accomplish its control and coordination mission from one aircraft. The center's usage is similar to that of the Air Force's air warning and control system but with the AFISC operating well forward and at tree top level.

AD-A076 191/6 PC **A07**/MF **A01**
Army Command and General Staff Coll Fort Leavenworth Ks
A Theory on Terrorist Activity in America and Its Effect on the United States Army.
Final rept.,
John B. Reisz. 8 Jun 79, 126p
Master's thesis.

The purpose of this thesis is to examine those factors which may contribute to the employment of the US Army in countering terrorist activity in the United States, and the subsequent effect such an action may have on the military and civilian sectors of the society. The study is focused on an analysis of terrorist strategies and tactics, possible mass destruction weapons, and examines how a terrorist organization, operating in the United States, might gain an appreciable degree of popular support through the use of nuclear, chemical, or biological weapons. The investigation considers how a terrorist might exacerbate the situation to encourage anti-military sentiments and continued terrorist attacks against military personnel and facilities. The study also addresses the domestic legal issues pertaining to the use of military forces in the civil community; and examines international law as it relates to the question of whether or not the United States may be required to extend prisoner of war status to captured terrorist personnel. The study concludes that a terrorist organization may employ a nuclear weapon in a manner designed to shift responsibility for the act to the nuclear power industry, and then attempt to provoke committed military forces into over-reacting to anti-nuclear demonstrations.

AD-A076 192/4 PC **A06**/MF **A01**
Army Command and General Staff Coll Fort Leavenworth Ks
Analysis of USAF Close Air Support Training.
Final rept.,
William C. Oberlin. 8 Jun 79, 109p
Master's thesis.

This study first examines the postulated characteristics of the modern battlefield and then proposes several close air support skill and knowledge requirements based upon the expected battlefield characteristics. The study next investigates the training requirements established in the current USAF close air support training program, TACM 51-50. A comparison between the close air support battlefield requirements and the current program reveals a lack of emphasis on joint training. The study also highlights several factors inhibiting unit accomplishment of the training programs. Mitigation of these factors is possible through centralized management of training program execution. Currently existing supervisory agencies are capable of assuming the execution management function. (Author)

AD-A076 236/9 PC **A05**/MF **A01**
Perceptronics Inc Woodland Hills Calif
Knowledgeable Opponent Models for Enemy Submarine Tactics in Training Simulators.
Final technical rept. Aug 78-Aug 79,
Don May , Efraim Shaket , and Antonio Leal. Jul 79, 80p PFTR-1071-79-8, NAVTRAEQUIPC-78-C-0107-1

This report describes four models which show promise for simulating a knowledgeable opponent for enemy submarine tactics in training simulators. While the models are primarily designed to simulate an opponent by selecting his decision alternatives, the models can also be used to simulate friendly forces as well. The four approaches are: (a) the Elicited Probability approach, (b) the Adaptive Decision Modeling approach, (c) the Heuristic Search approach, and (d) the Production Rules approach. A set of attributes for rating each approach are defined and described. The attributes are in three general categories. Attributes related to the modeling capability of the approach, those related to the development required to use the approach in a sub simulation, and those that relate to the expected performance of a simulation system based on a given approach. These attributes are then used to rate each approach. Finally, several representative decisions are discussed and the method of application for each approach described.

AD-A076 313/6 PC **A07**/MF **A01**
Naval War Coll Newport Ri Center for Advanced Research
Modernization and Chinese Strategic Debate,
Charles D. Lovejoy. Jun 79, 141p

What military strategies will China pursue in the wake of its post-Mao modernization. This study addresses the question through an examination of China's current capabilities, problems of defense modernization, sources of its strategic thought, and developments in defense matters since 1976. Its focus is the strategic debate defined by radical and professional elements of the Communist leadership. It concludes that Chinese military strategy is in a state of flux but with proponents of the professional line in charge there is a clear trend away from the defensive orientation of Mao's People's War Doctrine complemented by a new emphasis on regionally oriented conventional forces. (Author)

AD-A076 324/3 PC **A06**/MF **A01**
Army Command and General Staff Coll Fort Leavenworth Ks
Employment of Airborne Air Cavalry in the Airborne Antiarmor Defense.
Final rept.,
Theodore T. Sendak. 8 Jun 79, 109p
Master's thesis.

This study attempts to determine the most viable employment techniques and tactics that the air cavalry squadron (airborne) can use in the conduct of the airborne antiarmor defense. The investigation is focused on a general analysis of the airborne antiarmor defense, the threat facing the cavalry squadron and how these combine to allow the cavalry to survive and accomplish their mission on a mid-intensity battlefield in support of an airborne division. The investigation reveals that improved tactics and employment techniques will enhance mission accomplishment and survivability of the air cavalry squadron. It also confirms that developments to improve the mission capabilities of the air cavalry squadron in the airborne antiarmor defense are well within current technology. (Author)

AD-A076 326/8 PC **A04**/MF **A01**
Army Command and General Staff Coll Fort Leavenworth Ks
Is Tactical Air Support of an Airborne Battalion Feasible in Adverse Weather.
Final rept.,
Howard D. Bernard, III. 8 Jun 79, 74p
Master's thesis.

This study attempts to determine if tactical air support of an airborne battalion is feasible in adverse weather. The investigation is focused on an analysis of close air support, reconnaissance, and aerial resupply. Investigation reveals that the Air Force is capable of providing tactical reconnaissance and aerial resupply in adverse weather. Further examination reveals that the Air Force is only capable of very limited close air support in adverse weather. Hence, at the present time, tactical air support of an airborne battalion in adverse weather is not feasible. (Author)

16. MISSILE TECHNOLOGY

16A. Missile Launching and Ground Support

AD-A075 746/8 PC **A04**/MF **A01**
Construction Engineering Research Lab (Army) Champaign Il
Foam Overhead Cover Support (FOCOS) System for Dismounted and Mounted TOW Positions.
Final rept.,
Alvin Smith. Aug 79, 56p Rept no. CERL-TR-M-269

This report presents the results of a concept development study of the use of polyurethane foam in constructing protective overhead cover support for TOW fighting positions. Two principal methods of cover support fabrication were considered: 1. A two component spray polyeurethane fabrication foam applied on a prepared form. 2. Hand-mixed polyurethane foam expanded within a fabric form. In both cases, an arch-shaped support with a 4-ft (1.2-m) radius and a 5-ft(1.5-m) length was made. The foam-filled fabric form was selected as having the highest potential for successful application by weapon crews. Subsequent field tests of the selected system demonstrated that a TWO weapon crew can erect an effective cover support system in field without special tools or equipment. (Author)

AD-A076 016/5 PC **A03**/MF **A01**
Brunswick Corp Lincoln Ne Defense Div
Reusability of Filament Wound Launch Tubes.
Final rept. 14 Jan-14 Jul 76,
W. E. Dick. 23 Jul 76, 37p
Contract DAAH01-76-C-0483

An analysis of the launch tube environment produced by an aluminized rocket propellant was performed. Several matrix and liner materials were evaluated for their suitability for repeated use in launch tubes. Tubular specimens were fabricated and tested using a torch test fixture and a grit blast procedure. Twelve of the most promising systems were selected for shipment to the Army Missile Command for further evaluation. (Author)

16D. Missiles

N80-10103/3 PC **A04**/MF **A01**
Johns Hopkins Univ., Laurel, Md.
Advanced Missile Technology. A Review of Technology Improvement Areas for Cruise Missiles.
Final Report.
L. L. Cronvich, and H. P. Liepman. Oct 79, 66p
NASA-CR-3187, BFD-0-79-001
NASA ORDER L-75242A

Technology assessments in the areas of aerodynamics, propulsion, and structures and materials for cruise missile systems are discussed. The cruise missiles considered cover the full speed, altitude, and target range. The penetrativity, range, and maneuverability of the cruise missiles are examined and evaluated for performance improvements.

17. NAVIGATION, DETECTION, COMMUNICATIONS, AND COUNTERMEASURES

17A. Acoustic Detection

AD-A076 212/0 PC **A02**/MF **A01**
Bolt Beranek and Newman Inc Cambridge Ma
Temporal Factors in Sonar Target Classification. Theoretical and Experimental Analysis.
Final rept.,
John A. Swets. Oct 79, 11p
Contract N00014-76-C-0893

The objective of this contract was to conduct research on perceptual and decision processes involved in the detection, identification, and scaling of complex visual patterns, with emphasis on temporal aspects of the patterns and processes. During the three and one-quarter years of the project, five BBN technical reports were prepared and distributed, each describing a substantial experiment or set of experiments; all five have been or will be published in the archival literature. A book chapter not distributed as a BBN technical report was also prepared. A bibliography of these reports is appended. Also appended is a list of individuals who have been associated with project. (Author)

AD-A076 268/2 PC **A02**/MF **A01**
Wagner (Daniel H) Associates Paoli Pa
Acoustic Analysis/ASEPS,
David C. Bossard. 26 Jul 78, 11p
Contract N00014-75-C-0058

The work accomplished is in five areas: ASEPS model validation; ambient noise modeling questions; second order statistics for ASEPS; localization and tracking symposium; and Kent Beacon analysis and follow-up exercise planning.

17B. Communication

AD-A075 723/7 PC **A02**/MF **A01**
Naval Research Lab Washington Dc
Considerations for the Selection of Millimeter Frequency Bands for Mobile Satellite Communications.
Technical Memo.,
David H. Townsend. 14 Sep 76, 5p

To provide communications for Naval forces at sea, a communications system must be mobile and must provide ocean coverage. At line-of-sight frequencies, the necessary coverage is provided by satellite relay. For practical and military reasons, mobile SATCOM terminals for the Navy must be limited in size, weight, and cost and must provide substantial resistance to jamming or unintentional interference along with a low probability that transmissons will be intercepted. It is primarily the military requirement for anti-jam (AJ) and low probability of intercept (LPI) performance in Naval SATCOM systems that dicates a need for millimeter wavelength systems where wide bandwidth transmission for AJ/LPI and narrow antenna beamwidths for LPI are possible along with the size and weight necessary in mobile terminals.

AD-A076 033/0 PC **A05**/MF **A01**
Wright Air Development Center Wright-Patterson AFB Oh
Air to Ground Propagation Measurements in the UHF Band.
Technical rept.,
Richard B. Battelle. Jun 52, 89p Rept no. WADC-TR-52-138

The Communication and Navigation Laboratory, WADC, has completed a series of flight tests to determine radiation and propagation limitations at UHF. Major emphasis was placed upon the variation of ground antenna radiation pattern as a result of antenna site and terrain characteristics. Antennas located on flat terrain were found to produce multiple lobe patterns, while elevated antennas on rolling terrain produced smooth free-space patterns. Propagation from both antenna sites can be predicted with reasonable accuracy using AIL type UHF coverage charts, from which the probable system performance also may be determined. (Author)

AD-A076 163/5 MF **A01**
Air Force Avionics Lab Wright-Patterson AFB Oh
SATCOM 'EHF' Airborne Terminal Availability to Cost Analysis Demonstration.
Technical rept. Jul 78-Apr 79,
Herbert M. Bartman. Jul 79, 151p Rept no. AFAL-TR-79-1105
Availability: Microfiche copies only.

A practical approach (TASA/DEPEND Program) for analyzing system 'ilities' was demonstrated based on results reported in Technical Reports AFAL-TR-78-45 and AFAL-TR-78-135. This approach provides an analysis tool for studying the impact of changes in mission use on reliability, availability and dependability so that mission plans can be optimized with respect to achieving design objectives as related to cost. An important feature of this analysis approach is that the impact of malfunctions and failures on system availability and cost are separately assessed. This makes it possible to directly relate the contributions of hardware module reliability and maintainability to functional block performance. Such studies provide a means for concentrating reliability and maintainability resources in areas that will provide the maximum system improvement at the minimum cost. Also, a relational basis for trade-offs between reliability and maintainability requirements is obtained in relationship to cost.

AD-A076 172/6 PC **A03**/MF **A01**
Defense Communications Engineering Center Reston Va
Delay Analysis of TASI with Random Fluctuations in the Number of Voice Calls.
Technical note,
M. J. Fischer. Sep 79, 34p DCEC-TN-15-79, AD-E100 296

In this Technical Note we consider the performance of a voice communications system where the talkspurts of a conversation are buffered and multiplexed over the transmission channels. A mathematical model is given for the behavior of a talkspurt in the system when the voice calls are allowed to statistically come and go. A numerical

analysis is conducted to determine the sensitivity of various system measures of performance to the presence of voice calls and to relate various measures of performance. (Author)

AD-A076 181/7 PC **A06**/MF **A01**
Santa Fe Corp Alexandria Va
A Guide to U.S. Navy Command, Control, and Communications.
Final rept. 17 May 78-12 May 79,
D. A. Paolucci , Norman Polmar , and John Patrick. 1 Jul 79, 103p NOSC-TD-247
Contract N66001-78-C-0207

Naval command, control, and communications (C3) is examined from early applications through the development of U.S. Navy C3 to date. Current national and Navy C3 systems and organizations are describec. The role of C3 personnel is explained briefly. Finally, significant overall trends in U.S. Navy C3 technology and organization are identified. (Author)

AD-A076 182/5 PC **A03**/MF **A01**
Electronics Research Lab Adelaide (Australia)
The Effect of Scintillations on Transionospheric Communications.
Technical rept.,
D. G. Singleton. Apr 79, 43p Rept no. ERL-0074-TR

Consideration is given to the bearing ionospheric scintillation on the design and on the evaluation of the performance of satellite communication links. Emphasis is placed on establishing a design parameter of universal application. The cumulative amplitude distribution function (cdf), which was found application in this regard, is shown experimentally to be well represented by the Nakagami m-distribution at all scintillation levels. However, the cdf is demonstrated to be strictly valid only for amplitude modulated signals of short duration. Autocorrelation, power spectra and level crossing techniques are investigated in an effort to establish a design parameter more universally applicable than the cdf. A quantity message reliability, is defined which removes the short duration restriction inherent in the cdf. A formula for message reliability is developed which allows it to be evaluated for any fade margin and message length, given the scintillation index and the half width of the autocorrelogram of the scintillating channel. A design chart, embodying this information, is also illustrated. (Author)

AD-A076 216/1 PC **A17**/MF **A01**
Gte Sylvania Inc Mountain View Ca Electronic Systems Group-Western Div
Optical Submarine Communications by Aerospace Relay (OSCAR). Volume III. Model Development.
Final rept.,
P. Titterton , H. Sweeney , W. Scott , G. Elston , and T. Flom. 1 Jun 79, 396p
Contract N00039-77-C-0100
See also Volume 4, AD-C019 052. Includes envelope with chart.

This study explored the capability of blue-green optical communications to perform wide area broadcast to submerged submarines. Emergency action messages, selective call messages, and general broadcast traffic were specifically addressed. As a result of operating concept selection, model development and preliminary performance evaluation, it has been concluded that the system is feasible and optical communications can be maintained from orbiting satellites to submerged submarines. (Author)

AD-A076 217/9 PC **A04**/MF **A01**
Institute for Defense Analyses Arlington Va Program Analysis Div
Implementing Usage-Sensitive Charges for AUTODIN. Volume I. Basic Study.
Final rept.,
James P. Bell , John N. Fry , and Dale L. Moody. Nov 78, 67p IDA-S-504-VOL-1, IDA/HQ-78-20707, AD-E500 098
Contract DAHC15-73-C-0200
See also Volume 2, AD-A076 218.

A technique is developed for accumulating and processing data on AUTODIN digital communication usage, applying usage rates and computing user charges for billing purposes. The program was activated on Defense Commercial Communications Office computers and tested using a special 1978 sample of actual system traffic and several alternate rate structures. Resulting cost distributions are shown and discussed. The problems of system implementation and interpretation of data are discussed. (Author)

AD-A076 218/7 PC **A05**/MF **A01**
Institute for Defense Analyses Arlington Va Program Analysis Div
Implementing Usage-Sensitive Charges for AUTODIN. Volume II. AUTODIN Technical Appendices.
Final rept.,
James P. Bell , John N. Fry , and Dale L. Moody. Nov 78, 82p IDA-S-504-VOL-2, IDA/HQ-79-21639, AD-E500 099
Contract DAHC15-73-C-0200
See also Volume 1, AD-A076 217.

A technique is developed for accumulating and processing data on AUTODIN digital communication usage, applying usage rates and computing user charges for billing purposes. The program was activated on Defense Commercial Communications Office computers and tested using a special 1978 sample of actual system traffic and several alternate rate structures. Resulting cost distributions are shown and discussed. The problems of system implementation and interpretation of data are discussed. (Author)

N80-10240/3 PC **A09**/MF **A01**
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
The Deep Space Network.
Progress Report, Jul. - Aug. 1979.
15 Oct 79, 185p NASA-CR-162414, DSN-PR-42-53
Contract NAS7-100

No abstract available.

N80-10415/1 PC **A10**/MF **A01**
TRW, Inc., Redondo Beach, Calif. Space Systems Div.
The 30/20 Ghz Mixed User Architecture Development Study.
Final Report.
Oct 79, 216p NASA-CR-159686
Contract NAS3-21933

A mixed-user system is described which provides cost-effective communications services to a wide range of user terminal classes, ranging from one or two voice channel support in a direct-to-user mode, to multiple 500 mbps trunking channel support. Advanced satellite capabilities are utilized to minimize the cost of small terminals. In a system with thousands of small terminals, this approach results in minimum system cost.

N80-10416/9 PC **A02**/MF **A01**
TRW, Inc., Redondo Beach, Calif. Space Systems Div.
The 30/20 Ghz Mixed User Architecture Development Study: Executive Summary.
Sep 79, 24p NASA-CR-159687
Contract NAS3-21933

The baseline 30/30 GHz satellite communication system, designed for cost-effective communications in the years 1990 to 2000, incorporates onboard satellite demodulation and routing of individual 64 kbps digital voice-grade circuits. This level of routing flexibility is necessary to provide efficient communications to the large number of direct-to-user terminals (DTU) projected. The circuit interfacing hardware is distributed among all the DTU and master control stations. The switching circuitry which provides full interconnectivity between 30 to 45 thousand circuits is in the satellite. The DTU terminal cost, perhaps the largest element in the system cost, represents the largest economic value element of the system because it avoids using terrestrial signal distribution and routing and the charges associated with these functions. Satellite baseline design and power requirements for the system are examined.

N80-10433/4 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
Digital Psk to Bio-L Demodulator for 2 Sup Nx(Bit Rate) Carrier.
T. A. Shull. Aug 79, 8p NASA-TM-80159

A phase shift key (PSK) to BiO-L demodulator which uses standard digital integrated circuits is discussed. The demodulator produces NRZ-L, bit clock, and BiO-L outputs from digital PSK input signals for which the carrier is a 2 to the Nth multiple of the bit rate. Various bit and carrier rates which are accommodated by changing various component values within the demodulator are described. The use of the unit for sinusoidal inputs as well as digital inputs is discussed.

PATENT-4 156 556 PC **A02**/MF **A01**
Department of the Navy Washington DC
Fiber Optic Coupler with Concave Spherical Reflecting Elements.
Patent,
Aaron D. Klein, and Adolph L. Lewis. Filed 31 Oct 77, patented 29 May 79, 5p AD-D006 426/1, PAT-APPL-846 945
Supersedes PAT-APPL-846 945-77, AD-D004 521.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An optical coupler transfer light energy signals relative to an optical path which includes a fiber optic cable. A body memeber includes first and second ports at opposite ends for supporting first and second terminals of the fiber optic cable in laterally offset alignment relative to each other. First and second reflective elements are supported within the body member for collecting and reflecting light energy transmitted through the first and second terminals of the fiber optic cable. The first and second reflective elements are so configured as to transmit collimated light energy between them for completing the optical path between the first and second terminals of the fiber optic cable. First and second planar reflective surfaces are supported from opposite sides of the body member to intercept a portion of the path of the collimated light energy and are angularly disposed to laterally transfer light energy relative to the optical path between the first and second reflective elements. Preferably, the planar reflector surfaces are removable so as to minimize interference with light energy signal transmission between the collimating reflective elements and reduce attenuation.

PATENT-4 163 872 PC **A02**/MF **A01**
Department of the Navy Washington DC
Secret Pulse Signaling System.
Patent,
Ernst H. Krause. Filed 28 Jun 45, patented 7 Aug 79, 11p AD-D006 433/7, PAT-APPL-602 148
Supersedes PAT-APPL-602 148-45.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This invention relates broadly to a radio type intelligence transmission system and in particular to a radio pulse type signalling system wherein the time occurrence of the pulse signals is used both to convey and to dissemble the intelligence of the transmission. In accordance with the teachings of this invention, a group comprising two or more electrical impulses is transmitted over a given time interval. The desired message is conveyed by those electrical impulses bearing a certain time relationship to the start of the transmission while other of the electrical impulses bearing a different time relationship serve to mask the intelligence so conveyed. The group structure, that is, the disposition of impulses in the group, may be altered according to the information it is desired to send and according to the disguise desired for that information.

PATENT-4 165 914 PC **A02**/MF **A01**
Department of the Navy Washington DC
Access Coupler and Duplex Coupler for Single Multimode Fiber Transmission Line.
Patent,
Carl A. Villarruel, and A. Fenner Milton. Filed 10 Jan 78, patented 28 Aug 79, 6p AD-D006 436/0, PAT-APPL-868 361
Supersedes PAT-APPL-868 361-78, AD-D004 786.

Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This patent discloses optical access and duplex couplers for multimode fibers data transmission lines. Access couplers are for use with multiterminal communication systems whereas duplex couplers allow a single fiber to be used for data transmission in both directions. Grooves of different depths and widths are etched into silicon along natural crystal planes to position fibers of different diameters and to provide reflective silvered surfaces. Optical communication signals pass through smaller-diameter transmission lines to larger lines. Light surrounding the smaller-diameter line from the larger line is reflected by the reflective surfaces. Thus, information may be received and added as desired. (Author)

PB80-108731 CP **T03**
Federal Communications Commission, Washington, DC. Data Automation Div.
Broadcast Applications Address List.
Data file,
Charles Johnson. 1979, mag tape FCC/DF-79/014
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions.

The Broadcast Applications Processing/Address (BAPS) Label Data is to be run against the BAPS Address Label List Program to produce a listing (address) of all the AM, FM, and TV licensees in the BAPS Data Base.

PB80-801665 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Vocoders (Citations from the NTIS Data Base).
Rept. for 1964-Sep 79,
William E. Reed. Dec 79, 184p
Supersedes NTIS/PS-78/1056, NTIS/PS-77/0931, NTIS/PS-76/0782, and NTIS/PS-75/680. For the companion Published Search of the Engineering Index Data Base, see PB80-801673.

Government-sponsored research reports are cited on the design and application of vocoders in speech processing and related subjects. Studies relating to linear predictive vocoding, pitch discrimination, delta modulation, voice digitizers, phase vocoding, and acoustic convolvers are included. (This updated bibliography contains 175 abstracts, 17 of which are new entries to the previous edition.)

PB80-801673 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Vocoders (Citations from the Engineering Index Data Base).
Rept. for 1970-Sep 79,
William E. Reed. Dec 79, 163p
Supersedes NTIS/PS-78/1057, NTIS/PS-77/0932, and NTIS/PS-76/0783. For the companion Published Search of the NTIS Data Base, see PB80-801665.

This bibliography of worldwide journal literature cites reports on the design and application of vocoders in speech processing. Studies relating to linear predictive vocoding, pitch discrimination, delta modulation, voice digitizers, and acoustic convolvers are included. (This updated bibliography contains 156 abstracts, 52 of which are new entries to the previous edition.)

PB80-801905 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Frequency Synthesizers (Citations from the NTIS Data Base).
Rept. for 1964-Nov 79,
William E. Reed. Dec 79, 205p
Supersedes NTIS/PS-78/1254, NTIS/PS-77/1102, NTIS/PS-76/0829, and NTIS/PS-75/790. For the companion Published Search of the Engineering Index Data Base, see PB80-801913.

Spread spectrum and single sideband communications, navigation, and frequency control are applications included in these Federally-sponsored research reports on frequency synthesizers. Methods and devices used include surface acoustic waves, digital control, number representation schemes, phase shift, cesium beam tubes, and phased locked systems. (This updated bibliography contains 196 abstracts, 16 of which are new entries to the previous edition.)

PB80-801913 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Frequency Synthesizers (Citations from the Engineering Index Data Base).
Rept. for 1970-Nov 79,
William E. Reed. Dec 79, 223p
Supersedes NTIS/PS-78/1255 and NTIS/PS-77/1103. For the companion Published Search of the NTIS Data Base, see PB80-801905.

Communications, radar, music synthesizers, frequency control, biomedical and test equipment, and microwave systems are applications of frequency synthesizers included in these research reports from worldwide literature. Methods and devices used include surface acoustic waves, phased locked systems, digital control, number representation schemes, and voltage controlled systems. (This updated bibliography contains 214 abstracts, 31 of which are new entries to the previous edition.)

17D. Electromagnetic and Acoustic Countermeasures

AD-A076 032/2 PC **A03**/MF **A01**
Wright Air Development Center Wright-Patterson AFB Oh
Evaluation of Interference Blanker MX-1077(XA)/U.
Technical rept.,
Raymond R. Holberger , and Herbert M. Bartman. Jun 52, 41p Rept no. WADC-TR-52-134

The testing of Interference Blanker MX-1077(XA)/U under laboratory conditions is described. Performance tests were made. Tests were conducted under ground corona conditions, using the million-volt generator. Single sweep oscillographic photographs of blanker and blanking pulse output are shown. It was concluded that the blanker, as submitted, did not meet specification requirements and that further development work must be performed.

17E. Infrared and Ultraviolet Detection

AD-A075 683/3 PC **A03**/MF **A01**
Army Electronics Research and Development Command Fort Belvoir Va Night Vision and Electro-Optics Labs
Grafenwoehr II: Realistic Battlefield Sensor Trials. 'GRAF II' Test Plan Grafenwoehr, Germany.
Final rept.
Jun 79, 34p
Contract DEA68-G-1110

The GRAF II Summer Realistic Battlefield Sensors trials is being conducted from 18-30 June 1979 to determine effects of high explosive (HE) and smoke artillery barrages on E-O sensor performance and to quantify the optical propagation and the transport properties of the obscurants created by such barrages. GRAF II Summer is a follow-on activity to the GRAF II Winter Trials completed 26 Nov 1978. These trials will again be a joint effort between the United States and the Federal Republic of Germany.

AD-A075 743/5 PC **A02**/MF **A01**
Aerospace Corp El Segundo Ca Guidance and Control Div
Simulation of a Mosaic Sensor System.
Final rept.,
Kenneth K. Wong. 1 Oct 78, 25p TR-0079(4901-03)-5, SAMSO-TR-79-60
Contract F04701-78-C-0079

This report discusses a mosaic sensor system simulation program (MSSP) as a viable tool for the evaluation of a variety of mosaic sensor concepts. The idea of using a mosaic array to represent an image is an old one. Sensors constructed from the mosaic concept have the advantage of simplicity. Theoretically the image information may be instantaneously obtained from the outputs of all the detector cells in the mosaic array, thus eliminating the time delay problem inherent in a scanning-type sensor. A mosaic sensor system is often more reliable than a scanning sensor system because there are a minimum of mechanical components susceptible to failure. Typically, a mosaic focal plane consists of a large number of detector cells in order to produce fine image resolution. Digital simulation of a mosaic sensor system requires a considerable amount of repetitive calculations because of the large number of cells. It is very important to design a mosaic sensor simulation program with computation algorithms that are highly efficient in order to minimize the run time of the computer.

AD-A076 297/1 PC **A05**/MF **A01**
Naval Ocean Systems Center San Diego Ca
Resistance of Coated and Uncoated IR Windows to Seawater Corrosion.
Final rept. Oct 78-Jun 79,
J. D. Stachiw , and S. L. Bertic. 15 Aug 79, 91p
Rept no. NOSC/TR-421

Germanium and chalcogenide glass specimens were submerged to a 35-foot depth in San Diego Bay for 4 months and the deterioration of their surfaces noted. Some of the specimens were bare, some were protected with a single-layer anti-reflective (AR) IR coating, the remainder were coated with either polyolefine, polyethylene, or polypropylene plastic surcoat. To simulate different operational scenarios to which a submarine-mounted IR window may be subjected, some of the specimens were exposed to natural water circulation, others to water velocities of 6 feet per second. Additionally, some of the submerged specimens were heated by an electric current to simulate de-icing procedures in an arctic environment. Unprotected germanium was found to corrode rapidly while chalcogenide AMTIR-1 glass exhibited excellent corrosion resistance. All plastic surcoats failed by separation from the specimens due to presence of pinholes and water permeability. Anti-reflective coatings deteriorated also, but the transmission of the best single layer AR coating tested (Exotic Materials No. 40104) decreased only five percent, even though presence of pinholes in the coating generated many shallow (< 0.010 inch) corrosion craters in the surfaces of the germanium specimens. Passage of electric current through germanium accelerated the rate of corrosion; one hour of current flow produced more corrosion to the wetted window surface than 8000 hours without electric current. Next phase of testing will cover not only improved single layer, but also durable multilayer AR coatings that promise to extend the life of germanium windows in seawater to 12 months. (Author)

17G. Navigation and Guidance

AD-A075 783/1 PC **A03**/MF **A01**
National Aviation Facilities Experimental Center Atlantic City Nj
Transponder Performance Analyzer (TPA).
Final rept. Mar 76-Mar 78,
Carl Hazelwood. Oct 79, 34p FAA-NA-79-29, FAA-RD-79-54

The purpose of this document is to describe the Transponder Performance Analyzer (TPA) used for measurement of aircraft beacon transponder performance characteristics. The system was developed at NAFEC utilizing both 'in-house' designed and commercially available equipment. The system is fully self-supporting, is housed in a mobile bus, and has been used for ramp testing of transponders operating in general aviation aircraft and for bench testing of 'off-the shelf' units. (Author)

AD-A075 785/6 MF **A01**
Facility Checking Squadron (1866th) (Afcs) Scott AFB Il

TRACALS Evaluation Report. VORTAC Initial Evaluation Report, Clark AB, Philippines, 14 May-25 June 1979.
Final rept.,
Allen D. Clark. 28 Sep 79, 109p Rept no. 79/66N-176
Availability: Microfiche copies only.

This report presents the results of the 14 May - 25 June 1979 evaluation of the Clark AB VORTAC. The evaluation was conducted to determine the capabilities and limitations of the system in its installed environment. Results presented in this report can be used as a guide to anticipated system performance until there is a significant change in ground equipment, siting environment, screening or operational use. (Author)

AD-A075 810/2 PC **A03**/MF **A01**
National Telecommunications/Information Administration Boulder Co Inst for Telecommunication Sciences
Potential Use of High Frequency Data Transmission for Oceanic Air Traffic Control Improvement.
Final rept. Aug 78-Jul 79,
Martin Nesenbergs. Sep 79, 48p FAA-AM-79-9, TSC-FAA-79-19
Contract FA-RA-78-15

This report is concerned with the transatlantic Air Traffic Control (ATC) data links in the high frequency (HF) band. The report tries to broaden the appropriate communication system concepts by fortifying them with general parametric objectives. While such a broad approach cannot escape practical constraints and reductions, especially in eventual design and implementation stages, it is nevertheless a useful tool here. It leads one to characterize the HF propagation medium more fully. This in turn enables one to conceive data communications outlines with more advanced structures and with emphasis on exploiting the latest technology, both hardware and software. A full study should be beyond this initial effort and incorporate several system alternatives, plus their tradeoffs in terms of objective gains versus system costs. This brief report concludes with a parametric summary of ATC HF channel issues, operational factors, and the importance of performance specification. Pertinent unresolved issues are also listed at the end. (Author)

AD-A075 861/5 PC **A03**/MF **A01**
Wright Air Development Center Wright-Patterson AFB Oh
Evaluation of First Articles of Production Radio Receiving Set AN/ARN-18.
Technical rept.,
Bernard H. Dell. Jul 52, 33p Rept no. WADC-TR-52-146

Crosley Division, AVCO Manufacturing Corp.; Emerson Radio and Television Corp.; and Pacific Mercury Television Corp. were simultaneously awarded contracts to develop and produce Radio Receiving Sets AN/ARN-18 (Glide Slope Receiver) in accordance with Military Specification MIL-R-6201 dated 31 August 1950. MIL-R-6201 was written so as to combine the better features of development 20-channel glide slope receivers designed by Collins Radio Co. and Federal Telephone and Radio Corp. The Receiver was developed jointly by the three contractors who pooled their engineering facilities and performed most of the work at the Crosley Division plant. Six First Articles of production were built at Crosley and submitted for tests and approval. The results of the tests conducted on these First Articles indicated that the receivers failed to meet some of the requirements of Spec. MIL-R-6201. However, this receiver represented an improvement over the development models AN/ARN-18(XA-1) and AN/ARN-18(XA-2), and a considerable improvement over the Air Force Standard, Radio Receiving Equipment AN/ARN-5( ). In the opinion of the WADC project engineers, the design was as good as the current state of the art would permit. Therefore, during the pilot runs, which had their inception in August 1951, production approval was granted to all three contractors.

AD-A075 979/5 PC **A03**/MF **A01**
Army Missile Command Redstone Arsenal Al Technology Lab
Active Laser Seeker Concepts Evaluation.
Technical rept.,
Khalil Seyrafi , and Thomas H. James. Jun 79, 44p Rept no. DRSMI-T-CR-79-22

This final report covers the subject of active search and acquisition by a 10.6 micrometer missile seeker. The primary issue is the discrimination capabilities of an active system. Included in this report are performance evaluations in coherent and incoherent modes, compared to passive seekers, evaluations of the viability of several target discriminants, considerations regarding acquisition scan techniques, and economic considerations of such active seeker designs. (Author)

AD-A076 001/7 PC **A03**/MF **A01**
Wright Air Development Center Wright-Patterson AFB Oh
Navigational Systems Combining Inertial and Ground Velocity Vector Information.
Technical rept.,
John E. Clemens , Wolfram Kerris , and Friedricb Wazelt. Apr 52, 40p Rept no. WADC-TR-52-76
See also Rept. no. AF-TR-6045, dated Oct 40.

This report deals with the possibilities of combining inertial and ground velocity vector information in order to obtain a system with improved overall response. (Author)

AD-A076 119/7 PC **A11**/MF **A01**
Kansas Univ/Center for Research Inc Lawrence Remote Sensing Lab
Radar Image Simulation of Seasonally Dependent Reference Scenes.
Contract rept. 27 Mar-27 Sep 78,
J. C. Holtzman , J. E. Bare , V. H. Kaupp , E. E. Komp , and J. A. Stiles. Apr 79, 238p RSL-TR-370-2, ETL-0188
Contract DAAK70-78-C-0062

The results are reported from applying radar image simulation to produce simulated reference scenes of winter conditions for a missile guidance usage. A data base was constructed of the Watertown, New York, test site and simulated radar images were generated. The data base was prepared from historical data for an 'average' winter at the test site. Simulated radar images were produced via the point scattering model and an empirical model was used for predicting the electromagnetic reflectance from the ground, its cover, and overlying snow. Copies of the simulated radar images are included. The results reported were obtained for four (4) simulations corresponding to four specific altitudes in the terminal phases of the trajectory of a guided missile, each successively lower. The simulated images have been produced for testing against actual radar data of the same site via the Correlatron. These tests have not been performed as the actual radar data have not yet been obtained. (Author)

AD-A076 146/0 PC **A16**/MF **A01**
Advisory Group for Aerospace Research and Development Neuilly-Sur-Seine (France)
Advances in Guidance and Control Systems Using Digital Techniques.
Conference proceedings.
Aug 79, 358p Rept no. AGARD-CP-272
Presented at the Guidance and Control Panel Symposium Held in Ottawa, Canada on 8-11 May 79.

Contents: Functional Design Concepts, Trends, and Requirements, Advances in Analytical and Design Techniques, Advances in Digital System Design and architecture to Assure High Integrity, Data Processing and Computation Techniques, Software Design Validation Techniques, Including Simulation, and Operational and System Development Experience.

AD-A076 196/5 PC **A03**/MF **A01**
Advisory Group for Aerospace Research and Development Neuilly-Sur-Seine (France)
Report from the Guidance and Control Panel Working Group 04 on the Impact of Global Positioning System on Guidance and Controls Systems Design of Military Aircraft. Volume I.
Advisory rept.,
G. C. Howell. Sep 79, 45p Rept no. AGARD-AR-147-VOL-1

Working Group 04 was proposed by the Guidance and Control Panel as a follow-up to the Aerospace Applications Studies Committee No. 6 'Use of precision positioning systems by NATO' (AR No. 88). The objectives of the working group were to consider the integration of GPS in aircraft systems and make recommendations for implementation. Considering the large number of possible applications, the work was confined to a particular range of military aircraft. The report consists of two volumes: Volume I includes NAVSTAR/GPS description, examination of technical aspects of the system, applications to Counter Air Operations, Air Interdiction, Close Air Support Operations, Sea Patrol and Strike RPV, and recommendations. In volume II (Classified NATO-CONFIDENTIAL) which will be published later, are presented the results of four specific studies of the application of NAVSTAR to Close Air Support, Sea Patrol, Interdiction Strike, and Strike RPV. (Author)

AD-A076 214/6 PC **A04**/MF **A01**
Analytical Systems Engineering Corp Burlington Ma
Loran-C System Dynamic Model: Temporal Propagation Variation Study.
Final rept. 1 Oct 78-30 Apr 79,
L. W. Campbell , R. H. Doherty , and J. R. Johler. Jul 79, 62p ASECR-79-107, USCG-D57-79
Contract DOT-CG-829358-A
Prepared in cooperation with Colorado Research and Prediction Lab., Inc., Boulder, CO.

The results of a theoretical study to determine the expected extent of temporal variations in the Loran-C System are presented. Graphs of secondary phase correction vs distance, parametric in vertical lapse factor, for six values of ground impedance and parametric in ground impedance, for three values of vertical lapse factor are included. Although the secondary phase correction is most sensitive to ground impedance, it is relatively time stable and the most important parameter of concern in temporal variations is the vertical lapse factor. The effect of the surface refractive index on the secondary phase correction is negligible except in so far as it is correlated with the vertical lapse factor. A flow diagram and description of a program suitable for use on a desk calculator to calculate the secondary phase correction is included. (Author)

N80-10152/0 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
Algorithms and Logic for Incorporating ILS NASA Tcv B-737 Airplane Area Navigation System.
C. E. Knox. Sep 79, 23p NASA-TM-80167

The algorithms and logic for use in the implementation of instrument landing system (ILS) localizer deviation signals for the generation of navigation and guidance information are presented. The navigation position estimates, based on range information from a randomly chosen distance measuring equipment (DME) and ILS localizer deviation information, are illustrated. The ILS volumetric coverage and DME geometric checks are described and their addition to area navigation systems with minimum software modification are discussed.

PAT-APPL-6-005 255 PC **A02**/MF **A01**
Department of the Army Washington DC
Method and Apparatus for Calibrating Gyroscopically-Stabilized, Magnetically-Slaved Heading Reference System.
Patent Application,
Matthew J. Fisher, and William J. Gregory, Jr.
Filed 22 Jan 79, 16p AD-D006 413/9
Portions of this document are not fully legible.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A heading reference system mounted in a vehicle, e.g., an aircraft or a tank, includes a magnetic compass and a gyroscope. The magnetic compass is subject to deviation in the magnetic field, hence the system must be calibrated. If the vehicle is oriented in a starting direction, and the output of the magnetic compass compared to the output of the gyroscope, an error signal is developed. This error signal is filtered to reduce noise, then stored. The vehicle is then re-oriented and the procedure repeated until sufficient information is available to calibrate the system. A microprocessor may be

used for the computations and filtering of noise. (Author)

PAT-APPL-6-078 611 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
Autonomous Navigation System.
Patent Application,
S. J. Merhav. Filed 24 Sep 79, 19p N79-33177/3, NASA-CASE-ARC-11257-1
Subm-Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A low cost autonomous navigation system which disposes with accelerometers used in the conventional gimballed and strapdown inertial systems is described. The navigation system provides longitudinal and lateral vehicular specific force measurements in the locally level plane irrespective of the vehicle pitch, roll, and yaw motions. The navigation system provides longitudinal and lateral velocities in locally level geography coordinates along with vehicle position, altitude and attitude information. The system minimizes the number of sensors and system complexity, thus reducing errors, while providing a rapid method of north calibration. The system is composed of an unbalanced, pendulous, two axis gimbal system with a two degree of freedom leveling gyroscope and a heading gyroscope.

17H. Optical Detection

AD-A075 706/2 PC **A02**/MF **A01**
Aerospace Corp El Segundo Ca Engineering Group
Digital Simulation of a Multispectral Scanning Sensor System.
Final rept.,
R. G. Nishinaga , and K. K. Wong. 1 Oct 78, 23p TR-0079(4901-03)-4, SAMSO-TR-79-59
Contract F04701-78-C-0079

This report presents a fast, efficient method for simulating multispectral scanning astronomical sensors. A general description of different simulation approaches is discussed. The models used in the proposed method to characterize the sensor and its major radiation sources are presented. These models are developed to describe the basic signals and noise in the system. The structure and features of the resulting simulation are discussed. Representative sample outputs of the simulation are presented. (Author)

PATENT-3 119 086 Not available NTIS
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
Wedge Immersed Thermistor Bolometers.
Patent,
M. G. Dreyfus. Filed 29 Aug 61, patented 21 Jan 64, 3p N79-33449/6, PAT-APPL-134 619
Supersedes PAT-APPL-134 619-61. Subm-Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

An immersed thermistor bolometer for the detection of ultraviolet, visible, and infrared radiation is described. Two types of immersed bolometers are discussed. The immersion of thermistor flakes in a lens, or half immersed by optical contact on a lens, is examined. Lens materials are evaluated for optimum immersion including fused aluminum oxide, beryllium oxide, and germanium. The application of the bolometer to instruments in which the entrance pupil of the immersion optics has a high aspect ratio is considered.

PATENT-4 162 397 PC **A02**/MF **A01**
Department of the Navy Washington DC
Fiber Optic Acoustic Sensor.
Patent,
Joseph A. Bucaro, Edward F. Carome, and Henry D. Dardy. Filed 28 Jun 78, patented 24 Jul 79, 6p AD-D006 432/9, PAT-APPL-920 091
Supersedes PAT-APPL-920 091-78.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This patent describes an optical fiber acoustical sensor for detecting sound waves in a fluid medium. An optical fiber coil through which a light beam is transmitted is placed in a fluid medium. A sound wave propagating through the fluid medium and incident on the optical fiber coil changes the index of refraction of the optical fiber at the area of incidence. The index change causes a phase shift in the transmitted light which is detectable to denote the presence of the sound wave. (Author)

17I. Radar Detection

AD-A075 874/8 MF **A01**
Ohio State Univ Research Foundation Columbus Mapping and Charting Research Lab
Notes on Altitude Delay Settings.
Technical paper,
John R. Williams , and George A. Reams. Feb 52, 21p MCRL-TP-157, WADC-TR-52-96
Contract AF 18(600)-90
Availability: Microfiche copies only.

In many of the current radar sets, ground-range presentation is not available. However, partial compensation for the slant-range distortion can be obtained by changing all of the ranges by a constant amount, known as the altitude delay. A basis for selecting the magnitude of this delay is described in this paper and a graph is provided for its determination. (Author)

AD-A075 959/7 MF **A01**
Admiralty Surface Weapons Establishment Portsmouth (England)
A Linear Array Antenna of Greatly Reduced Size and Weight.
Technical rept.,
A. C. Large. Feb 74, 15p ASWE-TR-74-2, DRIC-BR-39420
Availability: Microfiche copies only.

A new type of antenna design is described that could be applied to radar antennas for surveillance or navigational purposes. Compared with antennas in current use large reductions, typically 50-70% in cross sectional size and overall weight, should be obtainable with this antenna design. (Author)

AD-A076 041/3 PC **A03**/MF **A01**
Wright Air Development Center Wright-Patterson AFB Oh
Development and Acceptance of Antenna AT-203(XA)/APT and Antenna AT-203/APT.
Technical rept.,
Kenneth E. Will. Jun 52, 29p Rept no. WADC-TR-52-159

A resume of the design, development, and tests of certain helical radiators in recessed cavities is presented. This report covers the original design work performed at the Aircraft Radiation Laboratory and further development of 10 experimental models attributed to the Dalmo-Victor Company in order to improve the electrical and mechanical properties of the antenna. As a result of tests conducted by Aircraft Radiation Laboratory on the experimental models of the AT-230(XA)/APT and development conducted as outlined in the Dalmo-Victor Company final report based on Exhibit MCREE-715, a production model of Antenna AT-230/APT is therefore now available to the Services. (Author)

AD-A076 147/8 PC **A04**/MF **A01**
Naval Research Lab Washington Dc
Radar Surveillance/Radar Tracking Variant of SPEARS.
9 Mar 79, 68p Rept no. NRL-7958
Revised pages to AD-A028 222.

The AAW performance simulation designated SPEARS (System Performance Evaluation and Requirements Simulation) now eixsts in a version which contains extensive revisions in the areas of radar surveillance and radar tracking. To upgrade the capability of the SPEARS simulation of shipboard radar surveillance, a detailed radar-surveillance model designated SURSEM (Surveillance Radar Systems Evaluation Model) has been modified and incorporated into SPEARS. In addition, a simple tracking algorithm has also been added to replace the implicit assumption that a target track is established instantaneously upon initial detection and then carried automatically until the target either leaves the radar's coverage volume or terminates its flight. Due to time and financial constraints, this version of SPEARS has undergone only limited testing at present.

AD-A076 249/2 PC **A04**/MF **A01**
George Washington Univ Washington D C School of Engineering and Applied Science
Radar Backscatter from a Vegetated Terrain. A Discrete Scattering Approach.
Contract rept.,
Roger H. Lang , and Spiro P. Sokolakis. Jun 79, 64p ETL-0159
Contract DAAK70-77-C-0142
Errata sheet inserted.

This report studies radar backscattering from a vegetated terrain. The vegetation is modelled by spherical water droplets which can be treated as discrete scatterers. The vegetation is assumed sufficiently lossy so that the underlying ground is not noticeable. The method of Foldy is used to evaluate the mean field in the vegetation when the wavelength of the incident radiation is large compared to the droplet size. Once an equivalent dielectric constant for the vegetation is obtained by the Foldy technique, single scattering is employed to evaluate the backscattering cross section. The resulting expression is found to compare favorably with experimental data. In addition to the three dimensional work, a one dimensional problem is analyzed. This analysis is compared with the Foldy approximation in the high density limit. (Author)

N80-10276/7 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Center, Edwards, Calif.
Shuttle Orbiter Radar Cross-Sectional Analysis.
D. W. Cooper, and R. James. Oct 79, 44p NASA-TM-72870, H-1095
Contract NAS4-2460

Theoretical and model simulation studies on signal to noise levels and shuttle radar cross section are described. Pre-mission system calibrations, system configuration, and postmission system calibration of the tracking radars are described. Conversion of target range, azimuth, and elevation into radar centered east north vertical position coordinates are evaluated. The location of the impinging rf energy with respect to the target vehicles body axis triad is calculated. Cross section correlation between the two radars is presented.

18. NUCLEAR SCIENCES AND TECHNOLOGY

18A. Fusion Devices (Thermonuclear)

BNL-25811 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Thermo-Fluid Mechanics of Liquid or Gas-Cooled Tubular First Walls.
J. A. Fillo, and J. R. Powell. 1979, 11p CONF-790802-9
Contract EY-76-C-02-0016
International conference on structural mechanics in reactor technology, Berlin, F.R. Germany, 13 Aug 1979.

An analysis for hydrodynamically and thermally fully developed heat transfer in a circular tube coupled with heat conduction in the tube wall is presented. Anisotropy of turbulent energy transport has been taken into account employing theoretical results for eddy diffusivity in the various directions. The energy equations for the fluid and solid body are solved simultaneously and are subject to continuity in heat flux and temperature at the interface. Solutions of the equations are found by separation of variables. Indicative of the analysis is that neglecting radial conduction but allowing circumferential conduction results in underestimating the wall temperature for relatively thin-wall structures and also the fluid temerature. In addition, a comparison of the dimensionless tube wall temperatue equation derived from the coupled analysis with that based on a constant heat trans-

fer coefficient indicates that the constant heat transfer analysis can be made identical with the present case by renormalizing the heat transfer coefficient. The analysis provides the designer with a simple set of analytical design equations for the coupling of solid and fluid temperature distributions for obtaining the Nusselt numbers. (ERA citation 04:050897)

BNL-26331 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
High Temperature Electrolysis.
J. R. Powell. 1979, 6p CONF-791103-16
Contract EY-76-C-02-0016
American Nuclear Society meeting, San Francisco, CA, USA, 12 Nov 1979.

An idealized flowsheet for a high temperature electrolysis fusion synthetic fuel plant is given. Two blanket module types are indicated; the first type heats steam or CO sub 2 to high temperatures for the HTE cells (T greater than or equal to 1000 exp 0 C) while the second heats a working fluid for an electrical power cycle and breeds tritium. (ERA citation 04:054260)

CONF-790494-(Dr) PC **A06**/MF **A01**
Oak Ridge National Lab., TN.
Arcing Phenomena in Fusion Devices Workshop.
R. E. Clausing. 1979, 125p
Contract W-7405-ENG-26
Arcing phenomena in fusion devices workshop, Knoxville, TN, USA, 5 Apr 1979.

The workshop on arcing phenomena in fusion devices was organized (1) to review the pesent status of our understanding of arcing as it relates to confinement devices, (2) to determine what information is needed to suppress arcing and (3) to define both laboratory and in-situ experiments which can ultimately lead to reduction of impurities in the plasma caused by arcing. The workshop was attended by experts in the area of vacuum arc electrode phenomena and ion source technology, materials scientists, and both theoreticians and experimentalists engaged in assessing the importance of unipolar arcing in today's tokamaks. Abstracts for papers presented at the workshop are included. (ERA citation 04:050844)

CONF-790738-2 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Transient 3-D Eddy Current in Multiple Conductors.
H. T. Yeh. 1979, 11p
Contract W-7405-ENG-26
Joint INTERMAG-MMM conference, New York, NY, USA, 17 Jul 1979.

A computer program has been implemented to model the transient eddy current in multiple thin conductors. This program allows for holes and multiple materials and has symmetry options built in. For cases with known solutions, the program has been checked for the eddy current induced in a cross, a plate with holes, a bent plate, an aluminium plate coil case, a plate with two materials, multiple plates, etc. (ERA citation 04:050891)

DOE/ET-0058/5 PC **A08**/MF **A01**
Oak Ridge National Lab., TN.
Alloy Development for Irradiation Performance. Quarterly Progress Report for Period Ending March 31, 1979.
S. Peterson. 1979, 171p
Contract W-7405-ENG-26

Separate abstracts were prepared for 13 of the included sections. (ERA citation 04:052387)

GA-A-15335 PC **A02**/MF **A01**
General Atomic Co., San Diego, CA.
Structural Concerns in Fusion Hybrid Reactors.
K. R. Schultz. Jan 79, 13p CONF-790802-22
Contract EY-76-C-03-0167-038
International conference on structural mechanics in reactor technology, Berlin, F.R. Germany, 13 Aug 1979.

The design environment for the blanket of a fusion hybrid is considered. It is noted that structural concerns play an important role in the trade-off between high performance and design simplicity for hybrid reactor systems and are quite challenging due to the high power densities and temperature gradients that may occur. The fusion--fission reactor concept and its mechanical features are reviewed. Structural concerns are discussed for tokamak, mirror and inertial fusion drivers. Various modes of fusion--fission operation are considered and the design requirements are discussed. The performance characteristics of hybrid blankets are considered. (ERA citation 04:052364)

GA-A-15475 PC **A02**/MF **A01**
General Atomic Co., San Diego, CA.
Design of Aluminum Stabilized Superconductor for Tokamak Toroidal Field Coils.
W. Y. Chen, J. S. Alcorn, and J. R. Purcell. Jun 79, 17p CONF-790815-5
Contract AT03-76ET51011
Cryogenic engineering conference, Madison, WI, USA, 21 Aug 1979.

A design study on an Al-stabilized 10-12T tokamak toroidal field-coil cooled with pool boiling LHe is presented. Relevant factors considered include the mechanical properties of pure aluminium, the degradation in resistivity due to neutron irradiation, the selection and cofiguration of the reinforcement materials, and the overall stability of the conductor. Both alloy Al and stainless steel have been considered as the reinforcement material. The dimensions and parameters of the conductor for each field region and the resulting TF-coils are summarized and compared with a copper design. (ERA citation 04:052367)

LA-UR-79-1475 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Helios, a 20 TW CO sub 2 Laser Fusion Facility.
J. S. Ladish. 1979, 10p CONF-790720-2
Contract W-7405-ENG-36
International congress LASER 79 opto-electronics, Munich, F.R. Germany, 2 Jul 1979.

Since June 1978 the Los Alamos Scientific Laboratory's Helios CO sub 2 laser fusion facility has been committed to an experimental target program to investigate the feasibility of laser produced inertial confinement fusion. This system is briefly described, and preliminary experimental results are reported. (ERA citation 04:050906)

LA-UR-79-393 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Tritium System Test Assembly Control System Cost Estimate.
R. A. Stutz. 1979, 17p CONF-790715-1
Contract W-7405-ENG-36
23. annual meeting of the American Association of Cost Engineers, Cincinnati, OH, USA, 15 Jul 1979.

The principal objectives of the Tritium Systems Test Assembly (TSTA), which includes the development, demonstration and interfacing of technologies related to the deuterium--tritium fuel cycle for fusion reactor systems, are concisely stated. The various integrated subsystems comprising TSTA and their functions are discussed. Each of the four major subdivisions of TSTA, including the main process system, the environmental and safety systems, supporting systems and the physical plant are briefly discussed. An overview of the Master Data Acquisition and Control System, which will control all functional operation of TSTA, is provided. (ERA citation 04:052375)

LA-7554-PR PC **A03**/MF **A01**
Los Alamos Scientific Lab., NM.
Transport and Reactor Theory. Progress Report, July 1--September 30, 1978.
W. F. Miller, Jr., D. J. Dudziak, R. D. O'Dell, R. E. Alcouffe, and M. F. Gomez. Nov 78, 37p
Contract W-7405-ENG-36

Progress is summarized in the areas of fission reactor neutronics, radiation shielding, fusion reactor nucleonics, reactor safety, and supporting research. (ERA citation 04:026435)

SAND-78-6023 PC **A02**/MF **A01**
CEA Centre d'Etudes de Valduc, Is-sur-Tille (France).
Design of an Inertial-Confinement Fusion Experiment Employing Heating by Electrons Oscillating in a Magnetic Mirror.
M. Roche. Oct 78, 10p
Contract EY-76-C-04-0789
Translation of French report.

A new concept directed to the achievement of inertial-confinement thermonuclear fusion by means of relativistic electron beams is described. A magnetic mirror located behind the exploding driver plays the double role of: (1) making it possible to build up very high current densities by virtue of the part played by the ions in the diode; (2) reflecting the electrons, which thus oscillate about the anode, leading to a great intensification of energy storage. (ERA citation 04:028575)

SAND-79-0778C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Recent Developments in High Average Power Driver Technology.
K. R. Prestwich, M. T. Buttram, and G. J> Rohwein. 1979, 10p CONF-790723-6
Contract EY-76-C-04-0789
International topical conference on high power electron and ion beam research and technology, Novosibirsk, USSR, 3 Jul 1979.

Inertial confinement fusion (ICF) reactors will require driver systems operating with tens to hundreds of megawatts of average power. The pulse power technology that will be required to build such drivers is in a primitive state of development. Recent developments in repetitive pulse power are discussed. A high-voltage transformer has been developed and operated at 3 MV in a single pulse experiment and is being tested at 1.5 MV, 5 kj and 10 pps. A low-loss, 1 MV, 10 kj, 10 pps Marx generator is being tested. Test results from gas-dynamic spark gaps that operate both in the 100 kV and 700 kV range are reported. A 250 kV, 1.5 kA/cm exp 2 , 30 ns electron beam diode has operated stably for 1.6 x 10 exp 5 pulses. (ERA citation 04:049398)

SAND-79-0819C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Progress Toward Fusion with Particle Beams.
G. W. Kuswa, K. W. Bieg, and E. J. T. Burns. 1979, 13p CONF-790723-5
Contract EY-76-C-04-0789
International topical conference on high power electron and ion beam research and technology, Novosibirsk, USSR, 3 Jul 1979.

This report discusses ion beam diodes which use insulating magnetic fields produced by coil systems. The development of ion diodes to produce light ion beams for fusion pellet ignition is briefly reviewed. The major goals for the light ion effort, which include the development of an ion diode to provide several TW/cm exp 2 , are discussed. The necessity to design ion sources which provide a prompt and uniform plasma layer when the diode voltage uses, in order to minimize electron loss and anode damage, is noted. Results of a number of materials and configurations tested for ion sources are reported. Numerical calculations are performed to investigate diode behavior. Future work on diodes with extracted beams is mentioned. (ERA citation 04:052377)

SAND-79-0932C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Self-Magnetically Insulated Power Flow.
J. P. VanDevender. 1979, 6p CONF-790622-6
Contract EY-76-C-04-0789
Pulsed power conference, Lubbock, TX, USA, 12 Jun 1979, Portions of document are illegible.

Electromagnetic power transport through self-magnetically insulated vacuum transmission lines has been developed into a useful and reliable technology. A power density of 160 TW/m exp 2 has been transported at approx. 100 percent efficiency over six meters. The theoretical understanding of power flow through lines of constant cross section has progressed through analytical theory and 2-D electromagnetic particle simulations. However, work needs to be done on the effects of line transitions in which the cross section changes in the direction of power flow. The major features of our present understanding will be reviewed and some promising hypotheses now under investigation will be presented. (ERA citation 04:052369)

SAND-79-1084C PC **A03**/MF **A01**
Sandia Labs., Albuquerque, NM.

Group 18A—Fusion Devices (Thermonuclear)

Small Helical Flux Compression Amplifiers.
J. E. Gover, O. M. Stuetzer, and J. L. Johnson.
1979, 33p CONF-790540-2
Contract EY-76-C-04-0789
International conference on megagauss magnetic field generation and related topics, Washington, DC, USA, 29 May 1979.

Small, explosively compressed, magnetic flux transducers with many closely spaced helical turns are investigated theoretically and experimentally. The analysis is limited to linear operation, but takes into account load influence, proximity effects, and switching delays. The latter are due to retarded breakdown in the wire insulation and to the finite decay time of the magnetic field in the wire. More than 150 experiments showed considerable data scatter. Shots which exhibited low clocking and high amplification were in good agreement with the theory. The main conclusion is that device performance is limited not only by flux loss, but by flux remaining in the generator after compression. (ERA citation 04:052370)

SAND-79-1234C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Magnet Optimization for Pulsed Energy Conversion.
W. K. Tucker, E. C. Cnare, W. P. Brooks, R. E. Wilcox, and W. D. Markiewicz. 1979, 4p CONF-790622-25
Contract EY-76-C-04-0789
Pulsed power conference, Lubbock, TX, USA, 12 Jun 1979.

A flux compression generator called PULSAR is being developed to meet power requirements for future fusion reactors. Key components of the generator are superconducting magnet, generator coil of normal metallic conductor, and an armature, either a metallic conductor or plasma. Chemical energy is used to increase the mutual inductance between the armture and nested generator coil and superconducting magnet. Flux compression occurs and electrical energy is transferred to a load inductance. This paper will present the results of a study that was conducted to design a suitable superconducting magnet for the PULSAR device. (ERA citation 04:052371)

SAND-79-7044 PC **A03**/MF **A01**
Science Applications, Inc., Albuquerque, NM.
Technical Review of the Sandia Laboratories' Particle Beam Fusion Program.
18 May 79, 38p
Contract EY-76-C-04-0789

This report considers the technical aspects of Sandia Laboratories' Particle Beam Fusion Program and examines the program's initial goals, the progress made to date towards reaching those goals, and the future plans or methods of reaching those original or modified goals. A summary of Sandia Laboratories' effort, which seeks to demonstrate that high voltage pulsed power generated high-current electron or light ion beams can be used to ignite a deuterium or tritium pellet, is provided. A brief review and assessment of the Sandia Pulse Power Program is given. Several critical issues and summaries of the committee members' opinions are discussed. (ERA citation 04:052379)

UCRL-13975 PC **A02**/MF **A01**
General Dynamics, San Diego, CA. Convair Div.
General Dynamics Convair Division Approach to Structural Analysis of Large Superconducting Coils.
R. W. Baldi. 21 Mar 79, 15p CONF-790802-31
Contract W-7405-ENG-48
International conference on structural mechanics in reactor technology, Berlin, F.R. Germany, 13 Aug 1979.

Most of the procedures and techniques described were developed over the past three years. Starting in late 1976, development began on high-accuracy computer codes for electromagnetic field and force analysis. This effort resulted in completion of a family of computer programs called MAGIC (MAGnetic Integration Calcaultion). Included in this group of programs is a post-processor called POSTMAGIC that links MAGIC to GDSAP (General Dynamics Structural Analysis Program) by automatically transferring force data. Integrating these computer programs afforded us the capability to readily analyze several different conditions that are anticipated to occur during tokamak operation. During 1977 we initiated the development of the CONVERT program that effectively links our THERMAL ANALYZER program to GDSAP by automatically transferring temperature data. The CONVERT program allowed us the capability to readily predict thermal stresses at several different time phases during the computer-simulated cooldown and warmup cycle. This feature aided us in determining the most crucial time phases and to adjust recommended operating procedure to minimize risk. (ERA citation 04:049389)

UCRL-82663 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Beryllium/Molten Salt Blanket: A New Blanket Concept.
J. D. Lee. 25 Apr 79, 20p CONF-790117-3
Contract W-7405-ENG-48
US/USSR symposium on fusion - fission hybrids, Princeton, NJ, USA, 22 Jan 1979.

The Beryllium/Molten Salt (Be/MS) blanket is an interesting contender for fissile breeding fusion reactors. Beryllium is used for neutron multiplication, and a Li and Th containing molten salt is used for on line removal of bred fusile (T) and fissile (U233) fuels. A conceptual Be/MS blanket is described and its neutronic performance is estimated. The Be/MS blanket has unique characteristics that may be advantageous and their potential advantages are presented. (ERA citation 04:052365)

UCRL-82762 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Railgun Accelerators for Launching 0.1-g Payloads at Velocities Greater Than 150 km/s.
R. S. Hawke. 15 Jun 79, 15p CONF-790741-1
Contract W-7405-ENG-48
DOE impact fusion workshop, Los Alamos, NM, USA, 10 Jul 1979.

The promise of an abundant energy supply has inspired many approaches to controlling thermal nuclear fusion. One approach to initiating fusion is to use a hypervelocity projectile to impact a deuterium--tritium (DT) pellet. For this purpose, magnetic accelerators have been propsed for accelerating macroparticles to velocities greater than 100 km/s. This paper summarizes a portion of a study that assesses the feasibility of accelerating a 0.1-g payload to a velocity of 150 km/s or more. In that study it was concluded that magnetic-gradient and railgun accelerators could achieve the goal. The critical factors that limit the design and operation of railgun accelerators are discussed. These factors are combined with a simulation code to assess potential railgun performance in this regime. (ERA citation 04:050901)

18B. Isotopes

GKSS-78/E/39 PC **A02**/MF **A01**
Gesellschaft fuer Kernenergieverwertung in Schiffbau und Schiffahrt m.b.H., Geesthacht-Tesperhude (Germany, F.R.). Inst. fuer Physik.
Hyperfine Structure and Isotope Shift Measurements on exp 235 U and Laser Separation of Uranium Isotopes by Two-Step Photoionization.
H. D. V. Boehm, W. Michaelis, and C. Weitkamp. 1978, 6p
U.S. Sales Only.

Two-step photoionization of an atomic beam and quadrupole mass analysis have been used for the precise measurement of the isotope shift between uranium isotopes 235 and 238 and the hyperfine structure of exp 235 U. For the 5915 A groundstate transition 15 hfs components were found. The residual atomic beam was isotopically enriched by factors 2.5 and 10 for exp 235 U and exp 238 U, respectively. (Atomindex citation 10:449120)

INIS-mf-4989 PC **A03**/MF **A01**
Karlsruhe Univ. (Germany, F.R.). Fakultaet fuer Maschinenbau.
Separation of Uranium Isotopes in the Separating Nozzle at Backdraft of the Heavy Fraction.
U. Heiden. 9 Feb 78, 39p
In German.Diss. (D.Eng.).
U.S. Sales Only.

H sub 2 /UF sub 6 mixtures were studied under laboratory conditions to determine how the backdraft of the heavy fraction, depleted with respect to exp 235 U, is influencing the efficiency of the separation nozzle, what effects tolerance variations of geometrical parameters have got on the uranium isotope separation under backdraft conditions, and what influence the backdraft has got on the control characteristic of the UF sub 6 strip-off ratio, which is an essential parameter for the operating performance of the cascade. From the experiments there is shown that the backdraft of the heavy fraction increases the elementary effect of isotope separation by up to 5%. The elementary effect of isotope separation entering with the second power into the efficiency of separation the efficiency of the separation nozzle increases by up to 10%. It is demonstrated that by the backdraft the optimal operating conditions are not changed in the first approximation. Tolerance variations, which may occur in the fabrication of engineering elements of separation because of the smallness of the characteristic dimensions, have been studied by the example of nozzle width and width of the stripper. There it appeared that the increase of the isotope separating effect, which is possible by backdraft, is reduced by tolerance variations of the nozzle width. Variations of the stripper width, which in a flow without backdraft affect the uranium isotope separation most of all, have no effect on the increase of the isotope separating effect by backdraft as far as the accuracy of measurement goes. Moreover the measurements show, that in a flow with backdraft the UF sub 6 strip-off ratio reacts more sensitively to variations of the inlet pressure and the expansion ratio of the light fraction then in a flow without backdraft but less sensitively to changes in UF sub 6 concentration, this having to be taken into account if the backdraft is to be utilized for stabilizing the cascade. (Atomindex citation 10:458990)

K/TD-394 PC **A04**/MF **A01**
Union Carbide Corp., Oak Ridge, TN. Nuclear Div.
Uranium Enrichment: A Review of the Present World Status - Capacity, Technology, and Plans.
W. J. Wilcox, Jr. 15 Feb 79, 64p
Contract W-7405-ENG-26

An overview is given of the evaluation and status of uranium enrichment processes: gaseous diffusion, gas centrifuge, and laser isotope separation. The uranium enrichment market (supply and demand) is also reviewed. The gradual encroachment of foreign enrichment capacity on US enrichment is pointed out. 49 figures. (ERA citation 04:048173)

18C. Nuclear Explosions

LA-UR-79-1992 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Hugoniot Measurements Near 50 MBAR.
C. E. Ragan, III. 1979, 14p CONF-790709-5
Contract W-7405-ENG-36
VII international AIRAPT conference, La Creusot, France, 30 Jul 1979.

A planar shock generated in the vicinity of an underground nuclear explosion was used to obtain Hugoniot data at 6.7 TPa for uranium relative to a molybdenum standard in an impedance matching experiment. Twenty-seven electrical contact pins were used to measure shock velocities of 27.0 and 22.8 km/s (+- 1%) in the molybdenum and uranium, respectively. The measurement differs from theory by more than 2.5 times the experimental uncertainty and represents the highest pressure at which Hugoniot data have been obtained. (ERA citation 04:050652)

PNE-G-89 PC **A03**/MF **A01**
Eberline Instrument Corp., Santa Fe, NM.
Project Gasbuggy: Radiation Contamination Clearance Report.
27 Jun 79, 41p
Contract ET-78-C-08-1582

Project Gasbuggy was the first US underground nuclear experiment for the stimulation of low-pro-

ductivity natural gas reservoirs. The report describes the radiological health and safety operations required for site cleanup and restoration to return the site to approximately its original condition. These operations were conducted from August through September of 1978. All equipment on site which was radiologically contaminated during previous gas production test activities was steam decontaminated to well below applicable release criteria and was released for unrestricted use. The radiological site restoration operations were successful. The radiological area survey indicates that no radiation levels above ambient background remain on-site. Only tritium (exp 3 H) in quantities well below criteria remains in the on-site soil as determined by soil sampling. The quality of the natural environment was improved by the removal of numerous man-made objects, the removal and controlled disposal of the site contaminants, and the sealing from possible release to the environment of a deep underground radiological source. (ERA citation 04:052131)

18D. Nuclear Instrumentation

BARC-848 PC **A02**/MF **A01**
Bhabha Atomic Research Centre, Bombay (India).
Novel Method of Spectrum Stabilization.
N. P. S. Sidhu. 1978, 5p
U.S. Sales Only.

A new type of spectrum stabilizer for a scintillation spectrometer is described. A pulse light source DM 160 is used to introduce an artificial peak in the spectrum at a convenient energy. The centroid of pulse spectrum corresponding to artificial peak is compared with that of suitable reference pulses obtained from the DM 160 driver circuit. Any drift in artificial peak produces a d.c. voltage at the output of centroid comparator and this voltage is used to control the gain of variable gain amplifier to counter the drift. With suitable adjustment the effect of any variation in pulse height of DM 160 driving pulse can be compensated so that the spectrometer gain is independent of any variation, drift etc. in the height of pulse driving DM 160 tube. This circuit is simple and gives improved performance compared to 2 channel method of obtaining the control voltage for variable gain amplifier. (Atomindex citation 10:449869)

CEA-N-1997(ed.2) PC **A03**/MF **A01**
CEA, Paris (France).
Direct Current Linear Measurement sub-Assembly Data and Test Methods. Nuclear Electronic Equipment for Control and Monitoring Panel.
Dec 77, 40p
In French.
U.S. Sales Only.

The M.C.H./M.E.N.T.3 document is concerned with sub-assemblies intended for measuring on a linear scale the neutron fluence rate or radiation dose rate when connected with nuclear detectors working in current. The symbols used are described. Some definitions and a bibliography are given. The main characteristics of direct current linear measurement sub-assemblies are then described together with corresponding test methods. This type of instrument indicates on a linear scale the level of a direct current applied to its input. The document reviews linear sub-assemblies for general purpose applications, difference amplifiers for monitoring, and averaging amplifiers. The document is intended for electronics manufacturers, designers, persons participating in acceptance trials and plant operators. (Atomindex citation 10:449782)

CEA-N-2030 PC **A03**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Services d'Electronique.
Temperature Dependence of PMT Cathode Sensitivity and Gain.
G. Breuze. Apr 78, 44p
In French.
U.S. Sales Only.

An especially designed experimental apparatus was built for systematically testing the intrinsic stability in operation of photomultiplier tubes (PMT). Jointly with the counting rate change effects (up to 10 exp 4 c.s exp -1 , NaI(Tl) exp 137 Cs) the temperature dependence (temperature range from -40 exp 0 C to 60 exp 0 C) of the PMT sensitivity was investigated upon over two hundred various tubes produced by four manufacturers. Because of their semiconductor compounds, the PMT anode sensitivity was found strongly depndent of the temperature, but moreover it should be noted that though the temperature produces the highest effect upon the photocathode sensitivity, its effect upon the dynodes gain is not generally negligible. The most stable semitransparent photocathodes (temperature coefficient <0,1 % per exp 0 C in the blue spectral region) are the bialcaline cathodes whatever the manufacturer may be; further, their monochromatic sensitivity hysteresis is always small (<2%) after a temperature run and temperature coefficients are quite constant in course of time. PMT gain stability appears connected with three technological parameters: the geometrical structure of dynodes, the secondary emitter nature and, probably, the photocathode associated with. In short, the best behavior (gain stability 1%) versus the temperature changes (and also versus counting rate changes) is typically given by bialcali, Cu-Be, venetian-blind PMT. For the measured EMI's PMT with Cs-Sb dynodes temperature gain stability is less good in the same operating conditions. (Atomindex citation 10:449777)

CONF-790590-1 PC **A02**/MF **A01**
Argonne National Lab., IL.
Nuclear Criticality Evacuation with Telemonitoring and Microprocessors.
R. W. Fergus, and H. J. Moe, Sr. 1979, 11p
Contract W-31-109-ENG-38
Aerospace/test measurement symposium, Canoga Park, CA, USA, 6 May 1979.

At Argonne National Laboratory, criticality alarms are required at widely separated locations to evacuate personnel in case of accident while emergency teams or maintenance personnel respond from a central location. The system functions have been divided in a similar manner. The alarm site hardware can independently detect a criticality and sound the evacuation signal while general monitoring and routine tests are handled by a communication link to a central monitoring station. The radiation detectors and evacuation sounders at each site are interconnected by a common two conductor cable in a unique telemonitoring format. This format allows both control and data information to be received or transmitted at any point on the cable which can be up to 3000 meters total length. The site microprocessor maintains a current data table, detects several faults, drives a printer, and communicates with the central telemonitoring station. The radiation detectors are made with plastic scintillators and photomultiplier tubes operated in a constant current mode with a 4 decade measurement range. The detectors also respond within microseconds to the criticality radiation burst. These characteristics can be tested with an internal light emitting diode either completely with a manual procedure or routinely with a system test initiated by the central monitoring station. Although the system was developed for a criticality alarm which requires reliable and redundant features, the basic techniques are useable for other monitoring and instrumentation applications. (ERA citation 04:050529)

CONF-790692-1 PC **A07**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
X-Ray and gamma Ray Transmission Densitometry.
G. D. Lassahn, A. G. Stephens, D. J. Taylor, and D. B. Wood. 1979, 149p
Contract EY-76-C-07-1570
International colloquium on densitometry, Idaho Falls, ID, USA, 10 Jun 1979.

Gamma and x-ray attenuation densitometers are systems in which measurements of the attenuation of one or several radiation beams are used to infer the density of the attenuating material. This report contains discussions of theoretical and practical aspects of densitometer design, operation, and data interpretation. (ERA citation 04:052100)

CRN-CNPA-76-27 PC **A03**/MF **A01**
Strasbourg-1 Univ. (France). Centre de Recherches Nucleaires.
Mechanism of Formation of Schottky Diodes.
J. P. Ponpon, and P. Siffert. 1976, 32p
U.S. Sales Only.

The formation of the potential barrier at the metal-silicon contact has been investigated. Special emphazis was given to the study of ageing of gold-N type silicon Schottky diodes, showing that their electrical properties are directly correlated to oxygen diffusion through the metal. A phenomenological model based on the behavior of oxygen with respect to the metal involved is proposed to describe the ageing for any metal deposited on N or P type silicon. (Atomindex citation 10:449853)

DESY-78/73 PC **A03**/MF **A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
Electron Energy and Position Measurement Using Lead-Scintillator Calorimeters with a New Light Collection System.
W. Hofmann, J. Spengler, D. Wegener, A. Krotzig, and W. Schmidt-Parzefall. Nov 78, 39p
U.S. Sales Only.

A lead-scintillator shower counter using a fluorescent radiation converter for collecting scintillation light is described. For primary electrons of 1 GeV an energy resolution o- 6 to 7.5% rms was obtained. With a 3x3 matrix of such calorimeter modules, the uniformity of energy response and the spatial resolution have been measured. From the energy sharing between the 9 cells, the electron impact position was reconstructed with an accuracy of 10 to 15 mm rms. (Atomindex citation 10:449821)

EGG-1183-1679 PC **A02**/MF **A01**
EG and G, Inc., Las Vegas, NV.
Development of an Airborne gamma Radiation System for Snow Surveys.
A. E. Fritzsche. 1979, 10p CONF-790495-1
Contract EY-76-C-08-1183
Workshop on remote sensing of snow and soil moisture by nuclear techniques, Voss, Norway, 23 Apr 1979.

An airborne gamma-snow survey system requires detailed design to obtain maximum precision and accuracy. The use of NaI(Tl) gamma detectors with a full gamma energy spectrum pulse height analyzer together with a small computer provides a self-contained and flexible system. The dual detector method determines atmospheric radon perturbations in the detection system. Detailed calibration experiments must be performed to determine twenty parameters that describe the physical nature of the system. Multiple high altitude and lake flights are used to obtain background components. Simulation pads, loaded with varying concentrations of exp 40 K, exp 232 Th, and exp 238 U yield photopeak stripping coefficients and basic system sensitivity. Multiple altitude flights over land lines provide air attenuation coefficients which may be converted to water attenuation coefficients. (ERA citation 04:052097)

IFVE-OEF-78-43 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Technique for Selecting "True" Coordinates in Drift Chambers.
B. Yu. Baldin, and V. I. Kryshkin. 1978, 8p
In Russian.
U.S. Sales Only.

A method for improving the loading characteristic of a single-gap drift chamber by selecting "true" coordinates before their recording is described. It is suggested to use two identical drift chambers mounted on the minimum distance in parallel. The difference between the drift times in the chambers is a linear function of the coordinate of the particle passing. For the difference compensation in the drift velocities a varactor variable delay line is used. The gain from the utilization of this method can be estimated by the following expression m approximately delta tsub(max)/2r, where m is a ratio of a number of events recorded without utilization of the device and with it, delta tsub(max) is the maximum drift time difference; 2r is a resolution time of the coincidence circuit. Two double-coordinate chambers with the drift gap of 50 cm, mounted in the total gas volume at the 8 cm distance from each other were used for verification of the method suggested. The Ar+5% CO sub 2 gas

mixture was used. When the field intensity changes from 200 to 360 V/cm, the drift velocity changes linearly, which permits to establish the necessary difference in velocities. The chambers had the spatial resolution of 0.7 mm (FWHM) for the X=1 cm coordinate and 1.7 mm for X=50 cm. The 50 ns time resolution corresponded to the coordinate resolution of 1.7 mm. The gain in the background suppression is 2.5, which corresponds to the results estimated according to the above formula. (Atomindex citation 10:452823)

IFVE-OEF-78-89 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Hexagonal Wire Proportional Chamber.
V. A. Viktorov, Yu. D. Karpekov, A. S. Konstantinov, A. N. Prokhorov, and V. A. Sergeev. 1978, 8p
In Russian.
U.S. Sales Only.

A wire proportional chamber in which the working zones equality of one and two adjacent wires on particle passing is obtained by electrode geometry is described. The chamber consists of partially overlapping hexagonal cells with signal wires in their centres and potential ones at the vertices. The signal electrodes are made of wire of the 0.028 mm diameter, the potential ones have the 0.1 mm diameter. The length of the wires is 200 mm, the distance between the signal wires is S=4 mm. The chamber was examined on the particle beam of the 70 GeV energy. The chamber was blowed off with the 70% Ar+30%CO sub 2 gaseous mixture, saturated with the ethyl alcohol vapors at 0 deg C. The chamber mounting on the mechanical platform ensured its movement perpendicular to the particle beam axis with the +-15 mu m accuracy. The average loading per one wire was 10 exp 4 particle/s. It is shown that for particles normally passing to the chamber plane the coordinate accuracy is +-1 mm. Time resolution not more 80 ns. The positive peculiarity of the hexagonal wire proportional chamber is attenuation of electrostatic interaction of the anodic wires due to their mutual removal from each other. This circumstance simplifies the problem of production of the given type large-size detectors and getting their stable characteristics. (Atomindex citation 10:452965)

IFVE-ONF-78-31 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Single-ARM Magnetic Spectrometer with Proportional Chambers for Measurement of Inclusive Spectra of Charged Particles.
N. I. Bozhko, A. A. Borisov, A. S. Vovenko, A. A. Volkov, and V. Yu. Glebov. 1978, 19p
In Russian.
U.S. Sales Only.

A single-arm magnetic spectrometer with 17 proportional chambers (PCh) for 912 channels is described. The initial beam in the spectrometer is deviated by the first magnet and induced on the target. Four PChs define the angle and point of incidence of a particle on the target and four PChs define the angle and point of flying of a secondary particle. After the second (analizing) magnet four PChs define the trajectory of the secondary particle. The identification of the secondary particles is performed by three threshold Cherenkov counters with high resolution. The space angle of the device is equal to 30 mu steradn. The spectrometer was used for measuring the yields of pi exp +- , k exp +- -mesons and protons in the 0-50 mradn angle range and 4-68 GeV/c pulse range on bombardment of a number of nuclear targets by 68 GeV protons, including several real targets of the neutrino experiment. (Atomindex citation 10:452836)

IFVE-ONF-78-4 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Multichannel Wide-Aperture Cherenkov Counter.
Yu. M. Antipov, V. A. Batarin, and V. A. Bezzubov. 1978, 6p
In Russian.
U.S. Sales Only.

A wide-aperture threshold cherenkov counter used for identification of pi - and k-mesons in the 7-21 GeV/c pulse range in the experiment on the search of charmed particle production in hadron interactions at the IHEP accelerator is described. The hermetric counter case is assembled of two steel tube sections with the internal diameter of 1.9 m and the length of 1.6 m. The frame made in the form of "a squirrel cage", on which 8 spherical mirrors of the 700x400 mm exp 2 and 8 photomultipliers are fixed in two rows, is mounted inside the tubes. The cherenkov light emmitted by a particle in the +-50 mradn range in respect to the counter optical axis is focused by each mirror on its photomultiplier. The counter working aperture is 1.6x1.2 m exp 2 . To increase the recording efficiency of the cherenkov emission a plexiglass mouthpiece with a spectra converter shifting the cherenkov light spectra from ultraviolet area into the area of the photomultiplier photocathode sensitivity was put on the photomultiplier opening inlet glass. A paraterphynil layer of the 150 mu g/cm exp 2 thickness, sprayed on the external mouthpiece surface by means of evaporation in vacuum with subsequent protection served as a spectra converter. The counter is filled with an air at the atmospheric pressure and has a velocity resolution of 2x10 exp -5 . The counter efficiency measured on the particle beam exceeds 0.99. (Atomindex citation 10:452819)

ITEF-123(1978) PC **A03**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Teoreticheskoi i Eksperimental'noi Fiziki.
Study on Accuracy of Spatial Recognition of Events Detected by the ITEPh ZHC-205 Liquid Hydrogen Bubble Chamber.
I. A. Mel'nichenko, V. I. Mikhajlichenko, and S. Ya. Nikitin. 1978, 29p
In Russian.
U.S. Sales Only.

The method of checking the GERA program operation, i.e. the program of spatial reconstruction of events detected by the ITEPh LHC-205 bubble chamber, is presented along with the results of the checking. The program operation was checked on artificial events obtained as a result of the program for event generation in a bubble chamber by the Monte-Carlo method. The estimation of reconstruction accuracy of corresponding and non-corresponding points has shown that for all types of points it is equal to 37 mu m in the plane of X - Y, and to 240 mu m in the plane of z with account of real measuring errors. The comparison of accuracies at the approximation of track by a screw line and a curve used in the GERA program has shown that, while approximating the track by a screw line, a systematic shift is observed at the determination of momentum and azimuth angle of tangent to track projection onto the x - y plane. While approximating the curve track used in the GERA program, no similar shifts are observed. It is shown that for tracks more than 18 cm long the error in the momentum does not exceed 10%. (Atomindex citation 10:449831)

ITEF-131(1977) PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Teoreticheskoi i Eksperimental'noi Fiziki.
Software for Processing and Storage of "ZhVK-205" Images Scanning Information.
I. A. Mel'nichenko, and V. I. Mikhailichenko. 1977, 8p
In Russian.
U.S. Sales Only.

A complex of programs ensuring the processing of the data of the inspection of bubble chamber photos, compilation of the archives of the inspection data, and subsequent work with them is briefly described. (Atomindex citation 10:452901)

ITEF-47(1978) PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Teoreticheskoi i Eksperimental'noi Fiziki.
Electronic Modules for Operation with Radiaton Detectors.
V. V. Domakeev, Yu. T. Kolotaev, A. I. Kravtsov, Yu. A. Semenov, and A. S. Sher. 1978, 13p
In Russian.
U.S. Sales Only.

Described are the units, developed for operation with scintillation counters, semiconductor detectors, and the electronics for proportional chambers. Circuits and operating characteristics of the following devices are presented: those of the linear adder, coincidence circuits, devider, module of the recording channels with memory, and the charge amplifier for silicon semiconductor detectors. (Atomindex citation 10:449792)

JINR-1-11194 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Processing Methods for Events with Strange Particles and gamma-Quanta Production in Antipp Interactions at 22.4 GeV/C.
B. V. Batyunya, I. V. Boguslavskii, and A. G. Zaikina. 1978, 12p
In Russian.
U.S. Sales Only.

Some methodological problems connected with scanning, measuring and fitting procedures of antipp interactions at 22.4 GeV/c with K exp 0 (or anti K exp 0), lambda , anti lambda and gamma particle production are described. Approximately 40000 pictures taken in an exposure of the 2m hydrogen bubble chamber "Ludmila" to a beam of 22.4 GeV/c antiprotons have been used. The methods of calculation of the correction weight, the classification of ambiguities between the lambda , K exp 0 , anti lambda and gamma fits are discussed. A formation procedure of the Data Summary Tape (DST) is described. The mean weight equals 25.5 for gamma , 2.0 for K exp 0 (anti K exp 0), 2.06 for lambda and 2.84 for anti lambda particles. About 60% of ambiguous hypothesis are divided. (Atomindex citation 10:452826)

JYFL-RR-5/78 PC **A02**/MF **A01**
Jyvaskyla Univ. (Finland). Dept. of Physics.
Combination Intermediate-Image Magnetic Plus Si(Li) Electron Spectrometer for In-Beam Experiments.
M. Luontama, J. Kantele, R. Julin, A. Passoja, and T. Poikolainen. Sep 78, 16p
U.S. Sales Only.

A magnetic lens plus Si(Li) combination in-beam beta spectrometer with focusing properties and field shape similar to those of an intermediate-image spectrometer is described. A high transmission and a large momentum band-width are achieved by placing both the target and the detector in a high magnetic field inside the lens. The beam enters the lens axially, and the Faraday cup is placed inside the lens. The spectrometer is well suited to singles conversion-electron spectroscopy, to (electron) (heavy-particle) coincidence measurements, to lifetime measurements and to studies of internal-pair transitions. (Atomindex citation 10:449828)

LA-UR-78-326 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Exp 3 He Detector Design for Low-Level Transuranic Waste Assay.
J. S. Hendricks, and D. A. Close. 1978, 6p
Contract W-7405-ENG-36

From this study it appears that a logical configuration of exp 3 He detectors imbedded in CH sub 2 for nondestructive assay of low-level transuranic waste is: rho = 1 atmosphere, d = 2.54 cm, x = 5.08 cm, t = 15.24 cm, h = 61 cm, and N = 5. If a greater detector response is desired, the best way to achieve it is to first double the detector height, h, and then to increase the number of tubes, N, and/or increase the exp 3 He density, rho. (ERA citation 04:052655)

LA-UR-79-1504 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Multichannel Electrometer Data-Acquisition System.
J. Somers, K. R. Hogstrom, R. T. Slice, I. I. Rosen, and A. R. Smith. 1979, 6p CONF-790549-14
Contract W-7405-ENG-36
Conference on computerized data - acquisition systems in particle and nuclear physics, Santa Fe, NM, USA, 14 May 1979.

A multichannel electrometer data-acquisition system, with associated software control, has been developed for dosimetry measurements of the pion beam at the Clinton P. Anderson Meson Physics Facility in Los Alamos, New Mexico. This system increases dosimetry data-acquisition rates by a factor equal to the number of data channels in use. It is based on a newly-developed electrometer amplifier capable of accurate measurements at picoampere signal levels. Design and construction of the electrometers is presented here in detail, and examples of data acquired with this system are presented. The effect on the readings due to scattered and background radiation has been measured. (ERA citation 04:050537)

LA-UR-79-1857 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Measurement System for High Enriched Spent Fuel Assemblies and Waste Solids.
G. W. Eccleston, H. O. Menlove, and M. W. Echo. 1979, 13p CONF-790707-19
Contract W-7405-ENG-36
20. annual meeting of the Institute of Nuclear Materials Management, Albuquerque, NM, USA, 16 Jul 1979.

A nondestructive neutron interrogation system, being developed to assay the exp 235 U content in bulk waste solids and high enriched spent fuel assemblies, is described. The instrument will be used for both nuclear materials accountability and criticality control by the facility operator. A range of fissile contents varies from 0 to 400 g in the waste and from about 8 to 12 kg in the spent fuel elements. Measurements must be obtained in the presence of large neutron (1.2 x 10 exp 7 n/s) and gamma (50,000 R/h) backgrounds. The system employs fast-neutron interrogation of the sample using a 5 mg exp 252 Cf source combined with delayed neutron counting after the source is moved to storage. Preliminary monte carlo calculations indicate measurement precisions of better than +-5% (2sigma) are obtainable for waste loadings in excess of 200 g exp 235 U. (ERA citation 04:053568)

LA-UR-79-1879 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
New Instrument for the Confirmation of Declared Power Histories of Central Station Nuclear Power Plants.
E. J. Dowdy, A. A. Robba, R. D. Hastings, and S. W. France. 1979, 20p CONF-790707-27
Contract W-7405-ENG-36
20. annual meeting of the Institute of Nuclear Materials Management, Albuquerque, NM, USA, 16 Jul 1979.

An operationally simple, portable, microprocessor-based, unattended reactor power monitor was developed for International Atomic Energy Agency inspector use in confirming operator records of the power history of nuclear power plants. The monitor is based on the principle that the leakage neutron flux outside the biological shield is proportional to the thermal power level. The leakage flux is detected and compared with the leakage flux from the same reactor for a confirmed calibration period. Several output options are available, and a record of more than three months of hourly measurements of the themal power of the plant can be obtained. The monitor has battery backup power for interruptions of host power of duration up to 18 hours. (ERA citation 04:051433)

LBL-9241 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Time Resolution Performance Studies of High Speed Photon Detectors.
B. Leskovar. May 79, 10p CONF-790720-1
Contract W-7405-ENG-48
International congress LASER 79 opto-electronics, Munich, F.R. Germany, 2 Jul 1979.

The time resolution capabilities of prototype microchannel plate and static crossed-field high gain photon detectors have been investigated. The devices studied included the LEP HR350 and PM 137-proximity focused high gain microchannel plate and VPM-154A/1.6L static crossed-field photomultipliers. Measurements were made of electron transit time, rise time, time resonse, single photoelectron time spread and multiphotoelectron time spread. The experimental data have been compared with results obtained with conventionally designed RCA 8850 and C31024 high speed photomultipliers. Descriptions are given of the measuring techniques. (ERA citation 04:052095)

LBL-9316 PC **A03**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Performance of a Pressurized Multiwire Proportional Chamber for Neutron Radiography.
B. Director. Jun 79, 43p
Contract W-7405-ENG-48
Thesis.

A study was made of the effect of gas density on resolution and efficiency of a neutron sensitive multiwire proportional chamber. Increasing the density will shorten the reaction products range. A pressure vessel was designed and constructed for 4 atm thereby reducing the range of the reaction products from the neutron converter by a factor of 4, compared to 1 atm. Pressurizing the chamber to 4 atm resulted in a spatial resolution of 1mm under the most favorable operating conditions. For the type of neutron converters used improving the efficiency is limited to a choice of material. Two different materials were tried, gadolinium and boron, with efficiencies of 6.3 and 2.3%, respectively. (ERA citation 04:052099)

PTB-ND-10 PC **A04**/MF **A01**
Physikalisch-Technische Bundesanstalt, Brunswick (Germany, F.R.). Neutronendosimetrie.
Neutron Calibration Technique for Detectors with Low Neutron/High Photon Sensitivity.
R. Jahr, S. Guldbakke, M. Cosack, G. Dietze, and H. Klein. Mar 78, 71p
U.S. Sales Only.

The neutron response of a detector with low neutron-/high photon sensitivity is given by the difference of two terms: the response to the mixed neutron-photon field, measured directly, and the response to the photons, deduced from additional measurements with a photon spectrometer. The technique is particularly suited for use in connection with targets which consist of a thick backing and thin layer of neutron producing material such as T, D, Li nuclei. Then the photon component of the mixed field is very nearly the same as the pure photon field from a 'phantom target', being identical with the neutron producing target except for the missing neutron producing material. Using this technique in connection with a T target (Ti-T-layer on silver backing) and the corresponding phantom target (Ti-layer on silver backing), a GM counter was calibrated at a neutron energy of 2.5 MeV. Possibilities are discussed to subsequently calibrate the GM counter at other neutron energies without the use of the photon spectrometer. (Atomindex citation 10:449823)

18E. Nuclear Power Plants

BMFT-FB-K-78-06 PC **A10**/MF **A01**
Bundesministerium fuer Forschung und Technologie, Bonn-Bad Godesberg (Germany, F.R.).
Development Project HTR-Electricity-Generating Plant, Concept Design of an Advanced High-Temperature Reactor Steam Cycle Plant with Spherical Fuel Elements (HTR-K).
Jul 78, 212p
In German.
U.S. Sales Only.

The report gives a survey of the principal work which was necessary to define the design criteria, to determine the main design data, and to design the principal reactor components for a large steam cycle plant. It is the objective of the development project to establish a concept design of an advanced steam cycle plant with a pebble bed reactor to permit a comparison with the direct-cycle-plant and to reach a decision on the concept of a future high-temperature nuclear power plant. It is tried to establish a largerly uniform basic concept of the nuclear heat-generating systems for electricity-generating and process heat. (Atomindex citation 10:449593)

DLCS-5000179 PC **A03**/MF **A01**
Duquesne Light Co., Shippingport, PA.
(Shippingport Atomic Power Station). Quarterly Operating Report, First Quarter 1979.
1979, 29p
Contract EY-76-C-11-0292

At the beginning of the first quarter of 1979, the Shippingport Atomic Power Station was operating with the 1A, 1B, 1C, and 1D reactor coolant loops and the 1AC and 1BD purification loops in service. The remainder of the expended PWR Core 2 was in storage under shielding water in the deep pit of the Fuel Handling Building. The 1A, 1B, 1C, and 1D 991 psig self-actuated steam relief valves remained gagged during the quarter to prevent leakage through the valve seats. Gagging of redundant relief valves is permitted by ASME Code and approved operating procedures. During the quarter, the Station was operated for Duquesne Light Company system grid including base load and swing load operation. Seven (7) swing load operations were performed on the LWBR Core this quarter to complete the LWBR operating plan of fifty (50) during this operating phase. The LWBR Core has generated 10,771.43 EFPH from startup through the end of the quarter. The generator load factor this quarter was 85%. (ERA citation 04:053166)

DOE/TIC-10169 PC **A06**/MF **A01**
Department of Energy, Washington, DC. Div. of Nuclear Power Development.
UPDATE: Nuclear Power Program Information and Data.
May 79, 106p

Statistical data on commercial nuclear power plant construction and operation in the US is presented. (ERA citation 04:051431)

EPRI-NP-1014(V.12) PC **A06**/MF **A01**
Bechtel National, Inc., San Francisco, CA.
Pool-Type LMFBR Plant 1000 MWe Phase A-Extension-2 Design. Final Report.
Jun 79, 101p

Drawings are presented concerning the reactor head compartment; equipment removal, reactor, and steam generator buildings; IHTS/IRACS piping enclosure; motor control layouts; maintenance and Na storage buildings; rectangular plant arrangement alternate 1; and general arrangement and reactor support buildings. (ERA citation 04:051494)

GA-A-15494 PC **A02**/MF **A01**
General Atomic Co., San Diego, CA.
Design of an HTGR for High-Temperature Process Heat Applications.
D. L. Vrable, R. N. Quade, and J. D. Stanley. Jul 79, 10p CONF-791006-1
Contract EY-76-C-03-0167
Joint power generation conference, Charlotte, NC, USA, 7 Oct 1979.

The high-temperature gas-cooled reactor (HTGR) offers a unique heat source for process heat applications since its operating temperature is substantially higher than that of other types of nuclear reactors. This paper discusses a design study of an advanced 842-MW(t) very high temperature reactor (VHTR) coupled with a chemical process whose product is hydrogen (or a mixture of hydrogen and carbon monoxide) generated by steam reforming of a light hydrocarbon mixture. A key feature of the plant is the nuclear reactor core, which utilizes helium as its primary coolant, has ceramic-coated fuel particles containing uranium and thorium, and employs graphite as the moderator and structural material. As in other HTGR designs, the VHTR has its entire primary coolant system contained in a prestressed concrete reactor vessel (PCRV) which provides the necessary biological shielding and pressure containment. The high-temperature nuclear thermal energy is transported to the externally located process plant by a secondary helium transport loop. In addition to providing the thermal driving potential required for the reforming process, the nuclear heat is also used to generate high-temperature, high-pressure steam to satisfy both the process and electrical generation needs for the operation of the nuclear plant and reforming process plant. (ERA citation 04:051542)

NUREG-0090-V-2-2 PC **A03**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Management and Program Analysis.
Report to Congress on Abnormal Occurrences. Volume 2, Number 2.
Quarterly rept. Apr-Jun 79,

Nov 79, 44p
See also NUREG-0090-V-2-1.

Section 208 of the Energy Reorganization Act of 1974 identifies an abnormal occurrence as an unscheduled incident or event which the Nuclear Regulatory Commission determines to be significant from the standpoint of public health or safety and requires a quarterly report of such events to be made to Congress. This report, the seventeenth in the series, covers the period April 1 to June 30, 1979. During this period, there were five abnormal occurrences. Three occurred at the 70 nuclear power plants licensed to operate; one involved an indication of low water level in a boiling water reactor, the second involved damage to new fuel assemblies and the third involved deficient procedures. The other two occurred at Agreement State licensees; one involved releases of tritium and contamination of food and the second involved overexposures from a radiography source. This report also contains information updating previously report abnormal occurrences.

SAND-79-0677C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Physical Protection of Power Reactors.
J. L. Darby. 1979, 11p CONF-790707-6
Contract EY-76-C-04-0789
20. annual meeting of the Institute of Nuclear Materials Management, Albuquerque, NM, USA, 16 Jul 1979.

Sandia Laboratories has applied a systematic approach to designing physical protection systems for nuclear facilities to commercial light-water reactor power plants. A number of candidate physical protection systems were developed and evaluated. Focus is placed on the design of access control subsystems at each of three plant layers: the protected area perimeter, building surfaces, and vital areas. Access control refers to barriers, detectors, and entry control devices and procedures used to keep unauthorized personnel and contraband out of the plant, and to control authorized entry into vital areas within the plant. (ERA citation 04:051442)

18F. Radiation Shielding and Protection

AD-A076 168/4 PC **A07**/MF **A01**
Army Armament Research and Development Command Aberdeen Proving Ground Md Ballistics Research Lab
The U.S. Army RADCON Team: Organization, Capabilities and Resources.
Final rept.,
David L. Rigotti. Sep 79, 131p ARBRL-MR-02954, AD-E430 311

This report is intended to acquaint the reader with what the RADCON Teams are, how they operate, how they are presently constituted and their overall capabilities. Information on how the teams maintain the required readiness posture is also presented. Finally the various emergencies in which the RADCON Team has been involved over the past twenty years are described and the unique capabilities that the team possesses beyond that required by pertinent regulations are highlighted. (Author)

BMI-2032 PC **A03**/MF **A01**
Battelle Columbus Labs., OH.
Mechanical Properties of Depleted Uranium-2 W/O Molybdenum Alloy.
O. L. Deel, and R. J. Burian. 16 Jul 79, 39p
Contract W-7405-ENG-92-080

The primary objective of this program is to develop data and techniques for determining the dynamic impact response of radioactive-material shipping-container systems for environmental control and safety overview and assessment. One phase of this program is the dynamic testing of 1/8-, 1/4-, and 1/2-scale models of uranium-shielded truck casks. These linearly scaled models are fabricated from the same materials typically used in full-size prototype casks. In order to analytically evaluate the results of dynamic tests, it is necessary to know the mechanical properties of the materials of construction. Since the properties of cast uranium--molybdenum alloys vary significantly with casting and heat-treating techniques, it is necessary to fully characterize the mechanical properties of the uranium used in the model tests. This report presents the results of these studies. The uranium alloy exhibited a tensile strength equal to or greater than that reported by others. As indicated by the percentage of elongation and reduction in area, the ductility was lower. Comparative data for the other mechanical properties measured were not found in the literature. (ERA citation 04:052634)

BNL-25944 PC **A02**/MF **A01**
Edinburgh Univ. (Scotland).
Excitations and Phase Transitions in Random Anti-Ferromagnets.
R. A. Cowley, R. J. Birgeneau, and G. Shirane. 1979, 25p CONF-790487-3
Contract EY-76-C-02-0016
NATO advanced study Institute on ordering in strongly - fluctuating condensed - matter systems, Geilo, Norway, 16 Apr 1979.

Neutron scattering techniques can be used to study the magnetic excitations and phase transitions in the randomly mixed transition metal fluorides. The results for the excitations of samples with two different types of magnetic ions show two bands of excitations; each associated with excitations propagating largely on one type of ion. In the diluted salts the spectra show a complex line shape and greater widths. These results are in good accord with computer simulations showing that linear spin wave theory can be used, but have not been described satisfactorily using the coherent potential approximation. The phase transitions in these materials are always smeared, but it is difficult to ascertain if this smearing is due to macroscopic fluctuations in the concentration or of an intrinsic origin. Studies of these systems close to the percolation point have shown that the thermal disorder is associated with the one-dimensional weak links of the large clusters. Currently theory and experiment are in accord for the two-dimensional Ising system but features are still not understood in Heisenberg systems in both two and three dimensions. (ERA citation 04:055759)

CONF-790524-11 PC **A02**/MF **A01**
Argonne National Lab., IL.
Recent Developments in Electron Degradation Theory: Selected Topics.
D. A. Douthat. 1979, 12p
Contract W-31-109-ENG-38
International congress symposium on radiation research and stem cells, Tokyo, Japan, 13 May 1979.

The electron degradation spectrum, essentially an energy distribution function of an irradiated system, provides a general basis for determining, not only the fate of the incident (or internally produced) radiation, but also for determining the initial or primary yields of the various excited states of the medium. The degradation spectrum thus describes the initial response of the medium to the radiation. This review-type paper focuses on results obtained in calculations for molecular hydrogen gas. The treatment is presented under the following headings: bookkeeping methods; definition of the degradation spectrum; collision data; water vapor; the total ionization cross section; modification of Gerhart's data; sensitivity of the computed degradation spectrum and mean energy per ion pair; initial yields in H sub 2 ; spectra of sub-excitation electrons; and spatial distributions. 70 references, 3 figures, 2 tables. (ERA citation 04:053858)

CONF-790738-1 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Itinerant Electron Magnetism in 3D-Transition Metals.
J. F. Cooke. May 79, 24p
Contract W-7405-ENG-26
Joint INTERMAG-MMM conference, New York, NY, USA, 17 Jul 1979.

Inelastic neutron scattering experiments performed on the 3-d transition metal ferromagnets have revealed striking behavior associated with the magnetic excitations found in these materials. Of particular importance is the disappearance of the spin-wave mode above a certain cut-off wave vector and the existence of spin-wave mode above a certain cut-off wave vector and the existence of spin-waves well above the Curie temperature. These phenomena can be understood if the magnetic electrons are assumed to be itinerant. At low temperatures, quantitative predictions of the itinerant electron theory based on KKR energy band calculations have been found to be in excellent agreement with experiment. In addition, these calculations predicted the existence of an optical spin-wave mode in nickel which was recently observed. A comparable numerical investigation at higher temperatures must await the development of a realistic finite temperature theory, which is currently under investigation. (ERA citation 04:049355)

COO-4014-13 PC **A02**/MF **A01**
Commonwealth Edison Co., Chicago, IL.
Dresden Unit 1: Chemical Cleaning. Progress Report, First and Second Quarters 1979.
29 Jun 79, 7p
Contract EY-76-C-02-4014

Engineering and construction activities associated with the Dresden Unit 1 chemical cleaning facility are described for January to June 1979. (ERA citation 04:053161)

DPSPU-79-124-2 PC **A02**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Plant.
Supplement to Safety Analysis Report for Packaging Steel Banded Wooden Shipping Containers for Slightly Enriched Uranium Metal (NLCO-1107).
D. L. Honkonen. Jun 79, 13p DPSP-79-71-6
Contract EY-76-C-09-0001

A total of 36 tons of slightly enriched uranium metal in the form of Mark VR, VE, and 15 slugs and cores is to be returned to NLO from Building 777-M. The most practical method of shipping this uranium is in the NLO wooden containers in which it was originally received. However, existing shipping regulations were written after this uranium was shipped and the Certificate of Compliance, COC, does not authorize the shipment of this uranium in these boxes and the Safety Analysis Report for Packaging, SARP, does not discuss this uranium. Therefore, this supplement to the SARP is intended to provide the basis for revision of the COC to permit shipping Mark VR, VE and 15 cores and slugs in NLO wooden containers. (ERA citation 04:053536)

HEDL-SA-1686 PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Recent Aerosol Tests in the Containment Systems Test Facility.
J. D. McCormack, R. K. Hilliard, and A. K. Postma. Oct 78, 21p
Contract EY-76-C-14-2170

The Containment Systems Test Facility (CSTF) is a 20-meter high, 850m exp 3 model containment vessel in which various sodium fire aerosol air cleaning tests are studied for purposes of developing and proof testing air cleaning techniques. The first series of tests was designed to study the properties of sodium fire aerosols without any air cleaning and to provide a data base for model verification using large-scale experiments. To date, three such tests (two pool fire and one spray fire) have been completed and are being analyzed. These tests will be discussed, as will plans for the air cleaning tests to follow. (ERA citation 04:050047)

HEDL-TME-79-22 PC **A10**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Users' Guide to CACECO Containment Analysis Code.
R. D. Peak. Jun 79, 216p
Contract EY-76-C-14-2170

The CACECO containment analysis code was developed to predict the thermodynamic responses of LMFBR containment facilities to a variety of accidents. The code is included in the National Energy Software Center Library at Argonne National Laboratory as Program No. 762. This users' guide describes the CACECO code and its data input requirements. The code description covers

the many mathematical models used and the approximations used in their solution. The descriptions are detailed to the extent that the user can modify the code to suit his unique needs, and, indeed, the reader is urged to consider code modification acceptable. (ERA citation 04:051675)

INIS-mf-4905 PC **A17**/MF **A01**
Fission Fragment Passage in a Small-Size Single Crystal.
V. F. Krasnoshtanov, and V. A. Maksimov. 1978, 376p CONF-7805178-P1
In Russian.Conference on reactor materials science, Alushta, Ukrainian SSR, 29 May 1978.
U.S. Sales Only.

By use of the method of mathematical simulation, the passage of a 100 MeV fission fragment with mass 140 amu and charge 20 through an insulated solid hydrogen single crystal was investigated. The problem was reduced to the consideration of multiple scattering in a Coulomb field in terms of classical mechanics. It was found that for the time of the fragment flight through the microcrystallite 17% of the electrons left the latter. Among the remaining electrons only 40% of them had energy lower than 10 eV (the work function for the given microcrystallite). Thus, the concept of the "ion burst" is confirmed with a greater probability. (Atomindex citation 10:450495)

INKA-Conf-78-078-007
PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation Eggenstein-Leopoldshafen (Germany, F.R.).
Reduction of Released Fission Products in PWR Containments (NAUA Code).
H. Bunz, and W. Schoeck. 1978, 19p CONF-781147-7
In German.Meeting of the projekt nukleare sicherheit, Karlsruhe, F.R. Germany, 28 Nov 1978.
U.S. Sales Only.

At the moment the NAUA code is the only activity for investigating the behavior of particulate fission products in a condensing atmosphere. By parameter variations there may be drawn from calculations with the NAUA code qualitative conclusions on the reduction of aerosols in the post-accident atmosphere of a LWR containment. Of special importance is the result that a high initial release is not conservative. This is true with and without taking account of the condensation of steam on the aerosol. The influence of condensation in any case causes a marked acceleration of the reduction process. For quantification of the condensing phenomena an experimental program was started. Results from measurements of the condensation on metal oxide aerosols were used for correcting the model equations. Further experiments deal with soluble aerosols and with the influence of the containment walls. (Atomindex citation 10:452727)

PTB-ND-13 PC **A03**/MF **A01**
Physikalisch-Technische Bundesanstalt, Brunswick (Germany, F.R.). Neutronendosimetrie.
Dialog Program for the Evaluation of Multichannel Spectra.
G. Dietze. Jun 78, 32p
In German.
U.S. Sales Only.

The computer code SPEKT is described for the analysis and manipulation of multichannel spectra in neutron dosimetry. It is a dialog system with a simple command string. The code has mainly been written in FORTRAN. Because of the modular structure of the program a user can add new routines in a simple way. (Atomindex citation 10:450204)

TID-29395 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Lectures Presented at the "Ettore Majorana" International Science Series, Erice, Italy, October 25–November 9, 1978.
T. A. Gabriel. 1978, 21p
Contract W-7405-ENG-26

Three lectures presented by T.A. Gabriel at the "Ettore Majorana" International Science Series meeting at Erice, Italy, during October 25 through November 9, 1978, are contained in this report. (ERA citation 04:024875)

UCRL-82684 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Micro-Fresnel Structures for Microscopy of Laser Generated Bright X-Ray Sources.
N. M. Ceglio, D. C. Shavers, D. C. Flanders, and H. I. Smith. 5 Jun 79, 30p CONF-790674-1
Contract W-7405-ENG-48
Conference on ultrasoft X-ray microscopy, New York, NY, USA, 13 Jun 1979.

A brief parametric survey of the x-ray characteristics of a gold micro-disk irradiated at 3 x 10 exp 14 watt/cm exp 2 by a 1 nsec Nd-glass laser pulse has been provided as an example of a laser generated bright x-ray source. It was shown that a simple phenomenological model of the laser generated x-ray source as a microscopic equilibrium plasma radiating as a blackbody for a finite time determined by its hydrodynamic disassembly and radiation losses, serves to provide an adequate approximation to the x-ray characteristics of such sources. The current state of x-ray microscopy within the LLL laser fusion program was briefly reviewed. Kirpatrick–Baez grazing incidence reflection x-ray microscopes are being used to provide 3 to 5 mu m resolution, broadband images (delta E/E approx. 0.3) over a spectral range from .6 keV to 3.5 keV. Zone Plate Coded Imaging is used to provide 5 to 10 mu m resolution, broadband (delta E/E approx. 0.5) images over a spectral range from 3 keV to 50 keV. Efficient x-ray lensing elements with anticipated submicron resolution are being developed for narrowband (delta E/E approx. 10 exp -2) imaging applications over a spectral range .1 keV to 8 keV. The x-ray lens design is that of a transmission blazed Fresnel phase plate. Micro–Fresnel zone plates with 3200 A minimum linewidth have been fabricated and preliminary resolution tests begun. The first resolution test pattern, having minimum linewidth of 2.5 mu m, was imaged in lambda = 8.34 A light with no difficulty. Newer test patterns with submicron minimum line are being prepared for the next stage of resolution testing. An off-axis Fresnel zone plate with 1600 A minimum linewidth is presently being fabricated for use as an imaging spectrometer in order to provide spatially separated, chromatically distinct images of characteristic line emissions from laser fusion targets. (ERA citation 04:049354)

18G. Radioactive Wastes and Fission Products

BNL-26333 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Leaching Properties of Solidified TRU Waste Forms.
P. Colombo, and R. M. Neilson, Jr. 1979, 25p CONF-790596-1
Contract EY-76-C-02-0016
WISAP task workshop - Waste isolation safety assessment program, Seattle, WA, USA, 24 May 1979.

Safety analysis of waste forms requires an estimate of the ability of these forms to retain activity in the disposal environment. This program of leaching tests will determine the leaching properties of TRU contaminated incinerator ash waste forms using hydraulic cement, urea–formaldehyde, bitumen, and vinyl ester–styrene as solidification agents. Three types of leaching tests will be conducted, including both static and flow rate. Five generic groundwaters will be used. Equipment and procedures are described. Experiments have been conducted to determine plate out of exp 239 Pu, counter efficiency, and stability of counting samples. (ERA citation 04:052671)

CONF-790420-22 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
FUETAP (Formed under Elevated Temperatures and Pressures) Concretes as Hosts for Radioactive Wastes.
J. G. Moore, G. C. Rogers, J. H. Paehler, and H. E. Devaney. 1979, 14p
Contract W-7405-ENG-26
International symposium on ceramics in nuclear waste management, Cincinnati, OH, USA, 30 Apr 1979.

Cementitious solids formed at less than or equal to 250 exp 0 C and less than or equal to 1000 psi offer excellent possibilities as hosts for radioactive wastes. Preliminary results are presented on the effect of mix composition, temperatre, and pressure on the physical properties of the resulting solids. Initial leach results are encouraging in the assessment of the ability of these FUETAP concretes to isolate radionuclides from the environment. (ERA citation 04:049548)

COO-4069-1 PC **A07**/MF **A01**
Rhode Island Univ., Kingston. Dept. of Ocean Engineering.
Geotechnical Aspects of Subsurface Seabed Disposal of High Level Radioactive Wastes. Annual Progress Report, January–December 1977.
A. J. Silva, and D.I. Calnan. May 78, 142p
Contract EY-76-S-02-4069

The status of the following major studies is reported: geotechnical properties of deep sea clays; experimental water migration studies;laboratory hole closure experiments; and in-site heat transfer experiments. (ERA citation 04:025660)

DP-MS-79-23(Rev.) PC **A02**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Predicted Environmental Impacts of Long-Term Waste Management at the Savannah River Site.
S. V. Topp. 1979, 22p CONF-790822-8(Rev.)
Contract EY-76-C-09-0001
87. AICHE national meeting, Boston, MA, USA, 19 Aug 1979.

This paper describes the different alternative approaches to long-term waste management at SRP, along with their probable relative costs, risks, and uncertainties; the issue of methodology for decision-making in nuclear waste management is also raised. This paper contains a preliminary listing of the SRP alternaties including a simple cost-risk analysis. The alternatives are: glass shipped offsite to Federal repository; air-cooled vault with glass at SRP; liquid waste slurry stored in SRP bedrock cavern; and continued tank farm operation with salt and sludge. (ERA citation 04:052654)

DP-1483 PC **A07**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Chemical Characterization of SRP Waste Tank Sludges and Supernates.
L. W. Gray, M. Y. Donnan, and B. Y. Okamoto. Aug 79, 141p
Contract EY-76-C-09-0001

Most high-level liquid wastes at the Savannah River Plant (SRP) are byproducts from plutonium and enriched uranium recovery processes. The high-level liquid wastes generated by these separations processes are stored in large, underground, carbon-steel tanks. The liquid wastes consist of: supernate (an aqueous solution containing sodium, nitrate, nitrite, hydroxyl, and aluminate ions), sludge (a gelatinous material containing insoluble components of the waste, such as ferric and aluminum hydroxides, and mercuric and manganese oxides), and salt cake (crystals, such as sodium nitrate, formed by evaporation of water from supernate). Analyses of SRP wastes by laser-Raman spectrometry, atomic absorption spectrometry, spark-source mass spectrometry, neutron activation analysis, colorimetry, ion chromatography, and various other wet-chemical and radiochemical methods are discussed. These analyses are useful in studies of waste tank corrosion and of forms for long-term waste storage. (ERA citation 04:052672)

DPSPU-79-11-8 PC **A02**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Plant.
1978 Radioactive Waste Tank Inspection Program.
R. L. Boyleston, M. A. Knowles, J. A. Baldwin, and F. G. McNatt. Jul 79, 12p
Contract EY-76-C-09-0001

The 1978 tank inspection program was completed with inspections through all 158 accessible annulus risers on the double-wall tanks using at least

one photographic technique at each riser. No unusual conditions were noted. Inspections were begun on tanks 25 to 28 which are in the late stages of construction; they will be completed during 1979. Eleven waste tank interior inspections were made with all conditions appearing normal. All three photographic techniques were used to record the progress of the tank 16 annulus cleaning demonstration (TA 2-850) and the tank 16 sludge removal demonstration (TA 2-943). An improved periscope with a black and white TV system was used during the sludge removal demonstration. Wall thickness measurements were made in three annulus risers; no general corrosion was discovered. Approximately 4,000 photographs were taken in 1978; 25% of them were of tank 16. (ERA citation 04:052673)

DPSPU-79-30-9 PC **A02**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Tritium in the Environment at the Savannah River Plant.
C. Ashley, C. C. Zeigler, and D. R. Quinsenberry. Jul 79, 8p CONF-790728-3
Contract EY-76-C-09-0001
24. annual meeting of the Health Physics Society, Philadelphia, PA, USA, 7 Jul 1979.

As part of the tritium monitoring program, atmospheric moisture, rainwater, and other media are routinely monitored at the Savannah River Plant (SRP), a major producer of tritium in the United States. A mathematical model to predict tritium concentrations in air and rainwater at distances up to 40 km from the emission source was developed using empirical data from the SRP environmental monitoring program and standard statistical techniques. Curvilinear regression analysis of the relationship between tritium concentrations and distance from the release points was used to develop an equation to represent the data. Comparison of calculated vs. measured concentrations and depositions of tritium show good agreement. (ERA citation 04:052186)

EUR-5897 PC **A20**/MF **A01**
Commission of the European Communities, Ispra (Italy). Joint Research Centre.
1. Technical Meeting on the Nuclear Transmutation of Actinides.
1978, 472p
U.S. Sales Only.

Individual papers were abstracted separately. (Atomindex citation 10:449899)

HEDL-SA-1684 PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Neutron Emission Observed from Spent Thermal Reactor Fuel Assemblies.
R. Gold, F. H. Ruddy, E. P. Lippincott, W. N. McElroy, and J. H. Roberts. 6 Nov 78, 5p CONF-790430-16
Contract EY-76-C-14-2170
Annual symposium on safeguards and nuclear material management, Brussels, Belgium, 25 Apr 1979.

A scoping experiment to characterize the neutron field generated from a Light Water Reactor spent fuel assembly has been successfully completed. Solid State Track Recorder (SSTR) neutron dosimeters have been exposed at the surface of a spent fuel assembly from a Pressurized Water Reactor. Acceptable track densities were obtained. From these SSTR neutron dosimetry observations, an absolute neutron flux of roughly 8000 n/(cm exp 2 .sec) was obtained at the surface of the spent fuel assembly three years after discharge. The deduced neutron energy spectrum, with a mean neutron energy of roughly 1.3 MeV, is intimately dependent upon the actinide content of the spent fuel. Hence, the results of this preliminary experiment have demonstrated that, with suitable calibration, SSTR neutron dosimetry can be successfully applied for non-destructive spent fuel actinide assay and for characterization of the radiation environment associated with spent reactor fuel assemblies. (ERA citation 04:051453)

HEDL-TME-77-22 PC **A03**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Effects of Environments on Spent Fuel.
C. W. Funk, L. D. Jacobson, and M. N. Menon. Jul 79, 48p
Contract EY-76-C-14-2170

This report describes the influence of water storage environment and transportation on spent light water reactor (LWR) fuel assemblies. It also estimates the storage duration and capacity requirements for several assumed scenarios. (ERA citation 04:052646)

HEDL-TME-77-82 PC **A05**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Inventory and Characterization of Spent LWR Fuel.
C. W. Funk, and L. D. Jacobson. Apr 79, 77p
Contract EY-76-C-14-2170

Spent light water reactor (LWR) fuel discharged from reactors and stored in water basins has been inventoried through 1976. Defective fuel has been defined and categorized, and the trends of failed fuel have been evaluated for their impact on the operation of receiving facilities. Failure mechanisms that release radioactivity have been identified. The sources and levels of activity have been estimated for typical LWR spent fuel assemblies. (ERA citation 04:049539)

INIS-mf-4917 PC **A02**/MF **A01**
National Research Council, Washington, DC.
Regulating Underground Disposal of Radioactive Waste in the United States.
1978, 13p
U.S. Sales Only.

In the United States, a number of Federal agencies have regulatory, research or operational responsibilities in the area of nuclear waste management. In particular, the Department of Energy (DOE) is engaged in the treating and disposal of radioactive waste, while under various federal laws, the Nuclear Regulatory Commission (NRC) has wide responsibilities in this field. High-level waste on the one hand, and low-level waste on the other, are being studied under the current NRC research programme aimed at establishing appropriate standards and regulations to be applied in the management of radioactive waste. (Atomindex citation 10:453062)

INIS-mf-4919 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation Eggenstein-Leopoldshafen (Germany, F.R.).
Underground Disposal of Radioactive Waste Regulations in The Netherlands.
J. C. Cornelis. 1978, 6p
U.S. Sales Only.

The only method of final disposal of radioactive waste currently envisaged in the Netherlands is disposal in rock-salt. This question is at present being studied by governmental authorities, and a public discussion is foreseen for the near future. Various Ministries, as well as local authorities at both provincial and municipal levels, are involved in the licensing and control of waste disposal. The principal stages are site selection (including that for test-drilling), construction of the mine, and supervision of the repository. These activities are governed by the legislation on mining as well as by nuclear regulations. One matter still to be decided is the nature of the body to be responsible for conducting the disposal operations. (Atomindex citation 10:453055)

INIS-mf-4922 PC **A02**/MF **A01**
Institute of Radiation Protection, Helsinki (Finland).
General and Regulatory Aspects of Nuclear Waste Disposal in Finland.
S. Vaeisaenen. 1978, 6p
U.S. Sales Only.

The Minister of Trade and Industry has recently appointed a committee to review the legislation in the nuclear energy field. The mandate of the committee includes the formulation of a law on nuclear waste management, which problem is also the subject of a current research and development programme. Licensing and control measures for nuclear installations already exist and these do include general safety measures relating to the management of nuclear waste. There are three types of licence - construction licence (including site approval), operating licence and fuel licence - given by the Ministry of Trade and Industry after consultation with various bodies, notably, the Institute of Radiation Protection. Conditions may be imposed on granting a licence, and periodic inspections are carried out during the operation of the installation. This licensing procedure, modified when necessary, could be applied to waste disposal facilities. (Atomindex citation 10:453071)

INIS-mf-4923 PC **A02**/MF **A01**
Junta de Energia Nuclear, Madrid (Spain).
Legislative Provisions Governing Installations for the Disposal of Radioactive Waste in Spain.
1978, 5p
In Spanish.
U.S. Sales Only.

Together with the other installations defined as nuclear or radioactive in the Law on Nuclear Energy of 1964, the construction and operation of nuclear waste facilities are subject to the prior authorisation of the Minister of Industry and Energy. They are also subject to the regulations applicable to mining activities. However, for the moment there exist no criteria regulating the underground disposal of radioactive waste, although it is generally agreed that responsibility for such disposal should be given to a public body, for instance the Junta de Energia Nuclear. Moreover, it is this body which is in charge of the sole existing installation in Spain for the storage of solid radioactive waste. (NEA). (Atomindex citation 10:453057)

INIS-mf-4924 PC **A02**/MF **A01**
Statens Kaernkraftinspektion, Stockholm (Sweden).
Regulatory Aspects on Underground Disposal of Radioactive Waste in Sweden.
A. Larsson. 1978, 2p
U.S. Sales Only.

The underground disposal of radioactive waste in Sweden is primarily governed by the Atomic Energy Act, the Radiation Protection Act, and to some extent by the Nuclear Liability Act. The regulatory authorities in question are the Nuclear Power Inspectorate, and the Radiation protection Institute. Application for a licence relating to waste management facilities are examined by the Inspectorate which presents its recommendations to the Government for decision. The Inspectorate is also called upon to impose conditions for the operation of the installation. The choice of site for the proposed nuclear waste facility is subject to the approval of the local authorities concerned. (Atomindex citation 10:453058)

INIS-mf-4925 PC **A02**/MF **A01**
Eidgenoessisches Amt fuer Energiewirtschaft, Bern (Switzerland).
Regulatory Aspects of Underground Disposal of Radioactive Waste in Switzerland.
H. R. Luethi. 1978, 8p
U.S. Sales Only.

The management of radioactive waste has become an important problem in Switzerland, and work has now begun on technical investigations and the preparation of a regulatory framework for deep-underground disposal. The law currently in force is the Federal Law on the Peaceful Use of Atomic Energyy and Radiation Protection, under which two licences are required, one for construction and one for operation. An amendment to this Law is envisaged whereby the licensing system will be modified, in particular by requiring an additional licence which will be granted by the Federal Government, with the consent of Parliament, if the safe disposal of waste can be guaranteed. The producers of radioactive waste are primarily responsible for the management thereof, but the National Cooperative Society for the Storage of Radioactive Waste (NAGRA) has the task of planning, constructing and operating repositories. The licensing authority in Switzerland is the Federal department of Communications and Energy. (Atomindex citation 10:453059)

INIS-mf-4926 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation Eggenstein-Leopoldshafen (Germany, F.R.).
Regulatory Aspects of Underground Disposal of Radioactive Waste in the United Kingdom.
1978, 10p

U.S. Sales Only.

It is a basic principle of radioactive waste management in the U.K. to comply with the system of dose limitations laid down by the International Commission on Radiological Protection. The Radioactive Substances Act, 1960, prohibits the disposal of radioactive waste on or from all premises (except those belonging to the Crown) unless authorised by the appropriate authority. Consultation, as necessary, with local and public authorities is provided for. Under the Nuclear Installations Act, 1965, nuclear installations, with some exceptions, require to be licensed by the Health and safety executive. Installations for the disposal of radioactive waste are not, as such, prescribed as nuclear installations under the Nuclear Installations Act, 1965 (and thereby governed by the licensing procedure under the Act), but they may be, if they involve the storage of bulk quantities of radioactive waste. The Secretary of State for the Environment, together with the Secretaries of State for Scotland and Wales are responsible for the development of a nuclear waste management policy, helped in this task by the newly-formed Radioactive Waste Management Advisory Committee. (Atomindex citation 10:453053)

INIS-mf-4927 PC **A02**/MF **A01**
Bundesministerium fuer Gesundheit und Umweltschutz, Vienna (Austria).
Situation on Regulatory Aspects of Underground Disposal of Radioactive Waste in Austria.
F. Muhlberger. 1978, 2p
U.S. Sales Only.

In Austria, under the Law on Radiation Protection, 1969, the construction and the operation of radioactive waste facilities both require to be licensed. Applications must be accompanied by detailed documentation and a licence will be granted only if safety is guaranteed and evidence given that any conditions imposed by the licensing authority have been, or will be, respected. Provision is also made for the later inspection of the facility. Additional licences, for example, under legislation relating to construction, or water, are also required. (Atomindex citation 10:453060)

K/ET-131 PC **A03**/MF **A01**
Paducah Gaseous Diffusion Plant, KY.
Long-Term Disposal of Enrichment Plant Tails.
S. M. Leone, E. W. Richardson, R. G. Knight, C. P. McGinnis, and J. H. Pashley. 18 Dec 78, 37p
Contract W-7405-ENG-26

It was assumed that a water insoluble uranium compound essentially free of fluorides would be the desired form for the final storage of cascade tails. UO sub 2 produced in a two-step process in which the UF sub 6 is reduced to UF sub 4 with hydrogen in a tower reactor, followed by pyrohydrolysis to UO sub 2 with steam in a screw reactor, has been selected as a suitable compound for storage. The UO sub 2 would be stored in 55-gallon steel drums holding approximately 900 kg, and the drums would be warehoused until a permanent storage facility could be developed. Approximately one-third of the fluoride content of the UF sub 6 will be recovered as anhydrous HF with potential for industrial sale, while the remaining fluoride content will be reacted with limestone and disposed of in landfills. The magnitude of the conversion process is illustrated by considering a typical electrical generation rate of 50 GW(e) per year. At this level, two plants nominally sized at 10 metric tons of uranium per day will be required. (ERA citation 04:052674)

LA-7900-PR PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Research and Development Related to the Nevada Nuclear Waste Storage Investigations. Progress Report, January 1--March 31, 1979.
B. M. Crowe. Jul 79, 20p
Contract W-7405-ENG-36

The results of research and program development related to the Nevada Nuclear Waste Storage Investigations is presented for Subtasks 3, 2, and 5. Batch sorption measurements have been completed for selected core samples obtained from exploration drill hole UE25Anumber 1. In general, sorptive properties of the cores are highly favorable for the isotopes studied. Work with tuff is continuing in the areas of crushed rock column studies, sorption ratio studies of U(VI), batch measurements of sorption of exp 241 Am and exp 239 Pu, and microautoradiographic work. Petrologic characterization of core samples from drill hole UE25Anumber 1 is completed; x-ray diffraction analyses are in progress. Field investigations of the basalts of Crater Flat are in progress. Areas of investigation include determination of the eruptive history and structural setting of volcanic centers, determination of magnetic polarity and basalt petrology (petrography and microprobe studies of mineral phases). Quality assurance procedures and work plans were processed for G-6 and CNC-11 programs. Requirements for a quality assurance program for the US Geological Survey are being evaluated. (ERA citation 04:051165)

NUREG/CR-0794 PC **A06**/MF **A01**
New York State Geological Survey/State Museum, Albany.
General Investigation of Radionuclide Retention in Migration Pathways at the West Valley, New York Low-Level Burial Site.
Annual rept. 1 Sep 77-30 Sep 78,
R. H. Dana, Jr., S. A. Molello, R. H. Fickies, and R. H. Fakundiny. Nov 79, 104p NYSGS-79/2403
Contract NRC-04-77-169

The scope of this research program includes several basic parts: a surface water program, a geomorphic and erosion study, a trench water study, and a soil analysis study. The study involved the collection of surface water data, a geomorphic study and mapping of a 4.1 km reach of Buttermilk Creek and adjacent areas within the drainage basin, the analysis of water samples collected from waste burial trenches, and the analysis of soil samples collected from a research trench near the burial site. Buttermilk Creek Valley is being actively subjected to erosion by a combination of fluvial transport, lateral channel scour processes, transport on alluvial fans, and landsliding. Local ponding may contribute to landsliding and slumping by bringing moisture contents close to the liquid limit of the soil. Tests indicate that the soil in which the waste is buried has been subjected to a load greater than the present day overburden loading. The theoretical depth limit to which cracks can penetrate in the soil is approximately 50 feet.

NUREG/CR-0911 PC **A03**/MF **A01**
Brookhaven National Lab., Upton, NY.
Properties of Radioactive Wastes and Waste Containers.
Progress rept. no. 11, Oct-Dec 78,
P. Colombo, and R. M. Neilson, Jr. Nov 79, 33p
BNL-NUREG-51042
Contract DOE-EY-76-C-02-0016
See also NUREG/CR-0667.

Portland cement waste forms were tested to determine the extent of particulate formation and the particle size distribution resulting from an impact loading environment. Results of this test are presented. The effect of cobalt-60 radiation exposure on the leachability of portland cement and urea-formaldehyde waste forms was investigated. A photomicroscopic technique was employed to examine the particle size of waste solids in bitumen waste forms.

ORNL/MIT-281 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Oak Ridge, TN. School of Chemical Engineering Practice.
Analysis of Stirred-Tank Carbonation Reactors.
N. F. Sheppard, R. C. Rizo-Patron, and W. H. Sun. 21 Nov 78, 36p
Contract W-7405-ENG-26

The removal of CO sub 2 from air in a calcium hydroxide slurry-agitated reactor was investigated to aid the design of such vessels. Gas-liquid interfacial areas were calculated using theoretical rate expression and experimental data at specific operating conditions. A correlation for interfacial areas was then determined as a function of impeller speed, impeller diameter, gas flow rate, and concentration of the slurry. Decontamination factors were also determined. (ERA citation 04:048203)

PB-292 599/8 PC**$45.00**/MF**$45.00**
Science Applications, Inc., Palo Alto, CA.
A Generic Assessment of Barge Transportation of Spent Nuclear Fuel,
A. J. Unione, A. A. Garcia, and R. Stuart. Sep 78, 280p AIF/NESP-014

This generic study provides data and methodologies to evaluate the transportation of spent reactor fuel to reprocessing plants by barge or barge-rail intermodal/water methods. The probabilities of barge accidents are examined under different conditions and severities to evaluate the radiological consequences including radio-nuclide source term data. The study addresses operational methods, equipment requirements and availability, manpower regulations, radiological impacts, and the economics associated with several different barge routes and barge-rail intermodal mixes. Also included are the estimated radiation doses to public personnel under normal operating conditions. Although the study specifically treats the shipment of fuel from reactors to reprocessing plants, the results are linked to intermodal/water transportation of spent fuel to interim or permanent storage facilities as well.

RHO-BWI-LD-20 PC **A07**/MF **A01**
Atomics International Div., Richland, WA. Rockwell Hanford Operations.
Preliminary Description of Hydrologic Characteristics and Contaminant Transport Potential of Rocks in the Pasco Basin, South-Central Washington.
R. A. Deju, and K. R. Fecht. Mar 79, 142p
Contract EY-77-C-06-1030

This report aims at consolidating existing data useful in defining the hydrologic characteristics of the Pasco Basin within south-central Washington. It also aims at compiling the properties required to evaluate contaminant transport potential within individual subsurface strata in this basin. The Pasco Basin itself is a tract of semi-arid land covering about 2,000 square miles in south-central Washington. The regional geology of this basin is dominated by tholeiitic flood basalts of the Columbia Plateau. The surface hydrology of the basin is dominated by the Yakima, Snake, and Columbia rivers. Short-lived ephemeral streams may flow for a short period of time after a heavy rainfall or snowmelt. The subsurface hydrology of the Pasco Basin is characterized by an unconfined aquifer carrying the bulk of the water discharged within the basin. This aquifer overlies a series of confined aquifers carrying progressively smaller amounts of groundwater as a function of depth. The hydraulic properties of the various aquifers and non-water-bearing strata are characterized and reported. A summary of the basic properties is tabulated. The hydrochemical data obtained are summarized. The contaminant transport properties of the rocks in the Pasco Basin are analyzed with emphasis on the dispersion and sorption coefficients and the characteristics of the potential reactions between emplaced waste and the surrounding medium. Some basic modeling considerations of the hydrogeologic systems in the basin with a brief discussion of model input requirements and their relationship to available data are presented. (ERA citation 04:048215)

RHO-BWI-78-100-AUG PC **A02**/MF **A01**
Atomics International Div., Richland, WA. Rockwell Hanford Operations.
Basalt Waste Isolation Program: Monthly Report.
R. A. Deju. 31 Aug 78, 25p
Contract EY-77-C-06-1030

A feasibility study is being conducted on utilizing basalt formations for terminal storage of commercial nuclear waste. Work is reported in the following projects: site studies, drilling, technology development, near-surface test facility, and repository. (ERA citation 04:025671)

RHO-CD-742 PC **A08**/MF **A01**
Atomics International Div., Richland, WA. Rockwell Hanford Operations.
Environmental Report of Purex Plant and Uranium Oxide Plant - Hanford Reservation.
Apr 79, 155p
Contract EY-77-C-06-1030

A description of the site, program, and facilities is given. The data and calculations indicate that

there will be no significant adverse environmental impact from the resumption of full-scale operations of the Purex and Uranium Oxide Plants. All significant pathways of radionuclides in Purex Plant effluents are evaluated. This includes submersion in the airborne effluent plumes, consumption of drinking water and foodstuffs irrigated with Columbia River water, ingestion of radioactive iodine through the cow-to-milk pathway, consumption of fish, and other less significant pathways. A summary of research and surveillance programs designed to assess the possible changes in the terresstrial and aquatic environments on or near the Hanford Reservation is presented. The nonradiological discharges to the environment of prinicpal interest are chemicals, sewage, and solid waste. These discharges will not lead to any significant adverse effects on the environment. (ERA citation 04:052188)

RHO-LD-78-3-D PC **A08**/MF **A01**
Atomics International Div., Richland, WA. Rockwell Hanford Operations.
Rockwell Hanford Operations Quarterly Report, Process Technology and Process Development, July 1978--September 1978.
Nov 78, 163p
Contract EY-77-C-06-1030

This quarterly report is the tenth in a series intended to provide information on research and engineering activities being performed to improve the processing of irradiated reactor fuels, the production of plutonium, and the management of resultant chemical wastes. (ERA citation 04:025614)

RHO-SA-83 PC **A02**/MF **A01**
Atomics International Div., Richland, WA. Rockwell Hanford Operations.
Iodide and Iodate Sodalites for the Long-Term Storage of Iodine-129.
D. M. Strachan, and H. Babad. Apr 79, 18p
CONF-790420-21
Contract EY-77-C-06-1030
International symposium on ceramics in nuclear waste management, Cincinnati, OH, USA, 30 Apr 1979.

There exists several proposals for the storage of exp 129 I. None of these proposes the use of a mineral with demonstrated geologic stability. The work described in this paper identified the minerals iodide and iodate sodalites (Na sub 8 (AlSiO sub 4) sub 6 I sub 2 /(IO sub 3) sub 2) as good candidates for the long-term storage of exp 129 I. (ERA citation 04:049565)

RLO-2227/T30-2 PC **A03**/MF **A01**
Oregon State Univ., Corvallis. School of Oceanography.
Cycling of Transuranic Radionuclides in the Columbia River, Its Estuary, and the North Pacific Ocean. Progress Report, February 1, 1978--February 15, 1979.
T. M. Beasley, and R. L. Holton. 1979, 50p
Contract EY-76-S-06-2227-030

Progress from February 1978 through January 1979 on the measurement of radionuclides in the Columbia River and its estuary, with principal emphasis on plutonium isotopes is reported. The goal is to budget the inventory of transuranic radionuclides in the Columbia River system below the Hanford Complex and to estimate the amounts of Pu and Am being carried to the Northeast Pacific Ocean by the river. The results to date have led to conclusions of some importance to the Department of Energy. These are as follows: (1) previously published data on the concentrations of plutonium in McNary reservoir are incorrect. The reported analyses show Pu concentrations significantly lower than those reported by Battelle; (2) sedimentation rates in McNary reservoir do not appear to be as high as those estimated by previous workers. Using Pu and exp 137 Cs subsurface maxima and exp 238 exp 239 exp 240 Pu ratios, it is concluded that the sedimentation rates in the lower portion of McNary reservoir near the Oregon shore are between 4 and 5 cm/yr and decrease dramatically as the Washington shore is approached. Sedimentation rates at Ice Harbor Dam on the Snake River and at Bonneville Dam on the Columbia are about 2 cm/yr; (3) in the Columbia River estuary where fine sediments are accumulating at a rate of about 3 to 4 cm/yr, plutonium does not appear to be migrating from depth toward the surface.; (4) evidence suggests that the contribution of the eight plutonium production reactors to the integrated plutonium inventory of Columbia River sediments is small; (5) a surprising fraction of the plutonium in Columbia River water is not retained by 0.3 mu millipore filters; and (6) in certain regions Columbia River sediments contain rather high mean plutonium loads (mCi/km exp 2). Each of these topics is discussed as well as the results of participation in both national and international quality control and intercalibration exercises. (ERA citation 04:049189)

SAN-1583-2 PC **A22**/MF **A01**
Boeing Engineering and Construction Co., Seattle, WA.
Global Spent Fuel Logistics Systems Study (GSFLS). Volume 2. GSFLS Visit Findings and Evaluations. Interim Report.
31 Jan 78, 507p
Contract EN-77-C-03-1583

This report is a part of the interim report documentation for the Global Spent Fuel Logistics System (GSFLS) study. This report describes a global framework that evaluates spent fuel disposition requirements, influencing factors and strategies. A broad sampling of foreign governmental officials, electric utility spokesmen and nuclear power industry officials responsible for GSFLS policies, plans and programs were surveyed as to their views with respect to national and international GSFLS related considerations. The results of these GSFLS visit findings are presented herein. These findings were then evaluated in terms of technical, institutional and legal/regulatory implications. The GSFLS evaluations, in conjunction with perceived US spent fuel objectives, formed the basis for selecting a set of GSFLS strategies which are reported herein. (ERA citation 04:049541)

SAN-1583-2A PC **A21**/MF **A01**
Boeing Engineering and Construction Co., Seattle, WA.
Global Spent Fuel Logistics Systems Study (GSFLS). Volume 2A. GSFLS Visit Findings (Appendix). Interim Report.
31 Jan 78, 500p
Contract EN-77-C-03-1583

This appendix is a part of the interim report documentation for the Global Spent Fuel Logistics System (GSFLS) study. This appendix provides the legal/regulatory reference material, supportive of Volume 2 - GSFLS Visit Finding and Evaluations; and certain background material on British Nuclear Fuel Limited. (ERA citation 04:049542)

SAN-1583-3 PC **A15**/MF **A01**
Boeing Engineering and Construction Co., Seattle, WA.
Global Spent Fuel Logistics Systems Study (GSFLS). Volume 3. GSFLS Technical and Financial Analysis. Interim Report.
31 Jan 78, 340p
Contract EN-77-C-03-1583

This report is a part of the interim report documentation for the Global Spent Fuel Logistics System (GSFLS) study. The technical and financial considerations underlying a global spent fuel logistics systems have been studied and are reported herein. The Pacific Basin is used as a model throughout this report; however the stated methodology and, in many cases, considerations and conclusions are applicable to other global regions. Spent fuel discharge profiles for Pacific Basin Countries were used to determine the technical systems requirements for alternative concepts. Functional analyses and flows were generated to define both system design requirements and logistics parameters. A technology review was made to ascertain the state-of-the-art of relevant GSFLS technical systems. Modular GSFLS facility designs were developed using the information generated from the functional analysis and technology review. The modular facility designs were used as a basis for siting and cost estimates for various GSFLS alternatives. Various GSFLS concepts were analyzed from a financial and economic perspective in order to provide total concepts costs and ascertain financial and economic sensitivities to key GSFLS variations. Results of the study include quantification of GSFLS facility and hardware requirements; drawings of relevant GSFLS facility designs; system cost estimates; financial reports - including user service charges; and comparative analyses of various GSFLS alternatives. (ERA citation 04:049543)

SAN-1583-3(App.A,B) PC **A13**/MF **A01**
Boeing Engineering and Construction Co., Seattle, WA.
Global Spent Fuel Logistics Systems Study (GSFLS). Volume 3A. GSFLS Technical Analysis (Appendix). Interim Report.
31 Jan 78, 293p
Contract EN-77-C-03-1583

This report is a part of the interim report documentation for the Global Spent Fuel Logistics System (GSFLS) study. The technical and financial considerations underlying a global spent fuel logistics systems have been studied and are reported. The Pacific Basin is used as a model throughout this report; however the stated methodology and, in many cases, considerations and conclusions are applicable to other global regions. Spent fuel discharge profiles for Pacific Basin Countries were used to determine the technical systems requirements for alternative concepts. Functional analyses and flows were generated to define both system design requirements and logistics parameters. A technology review was made to ascertain the state-of-the-art of relevant GSFLS technical systems. Modular GSFLS facility designs were developed using the information generated from the functional analysis and technology review. The modular facility designs were used as a basis for siting and cost estimates for various GSFLS alternatives. Various GSFLS concepts were analyzed from a financial and economic perspective in order to provide total concepts costs and ascertain financial and economic sensitivities to key GSFLS variations. Results of the study include quantification of GSFLS facility and hardware requirements; drawings of relevant GSFLS facility designs; system cost estimates; financial reports - including user service charges; and comparative analyses of various GSFLS alternatives. (ERA citation 04:049544)

SAN-1583-4 PC **A09**/MF **A01**
Boeing Engineering and Construction Co., Seattle, WA.
Global Spent Fuel Logistics Systems Study (GSFLS). Volume 4. Pacific Basin Spent Fuel Logistics System.
Jun 78, 178p
Contract EN-77-C-03-1583

This report summarizes the conceptual framework for a Pacific Basin Spent Fuel Logistics System (PBSFLS); and preliminarily describes programatic steps that might be taken to implement such a system. The PBSFLS concept is described in terms of its technical and institutional components. The preferred PBSFLS concept embodies the rationale of emplacing a fuel cycle system which can adjust to the technical and institutional non-proliferation solutions as they are developed and accepted by nations. The concept is structured on the basis of initially implementing a regional spent fuel storage and transportation system which can technically and institutionally accommodate downstream needs for energy recovery and long-term waste management solutions. (ERA citation 04:049545)

SAND-79-0362 PC **A03**/MF **A01**
Sandia Labs., Albuquerque, NM.
Early In-Situ Measurements Program for the Waste Isolation Pilot Plant.
W. E. Wowak. Jun 79, 49p
Contract EY-76-C-04-0789

The technical basis and description of measurements for the early in-situ measurements program at the WIPP are described and a proposed organizational structure is presented. Measurements are needed for verification of design predictions and also for a prelude to the main experiment program. The design verification measurements will be concentrated in the first shaft and the underground support and access areas. Early experiments will be concentrated in the test drifts on the storage horizons. Recommendations are made to DOE for appropriate division of responsibility among Bech-

tel, the technical support contractor, the instrumentation contractor, and Sandia. (ERA citation 04:049566)

SAND-79-1113C PC **A03**/MF **A01**
Sandia Labs., Albuquerque, NM.
Evaluation of the Proposed WIPP Site in Southeast New Mexico.
W. D. Weart. 1979, 35p CONF-790822-7
Contract EY-76-C-04-0789
87. AICHE national meeting, Boston, MA, USA, 19 Aug 1979.

Five years of earth science characterization of the proposed Waste Isolation Pilot Plant (WIPP) site provide a high level of assurance that the area is satisfactory for development of a geologic repository. Ecological investigations and socioeconomic studies have indicated only relatively benign impacts will occur from construction, operation and long-term aspects of the repository. (ERA citation 04:051169)

SAND-79-1275C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Model Development for In Situ Test Results in Argillaceous Rock.
L. D. Tyler. 1979, 23p CONF-790683-1
Contract EY-76-C-04-0789
ONWI-LLL workshop on thermomechanical modeling for a hard rock repository, Berkeley, CA, USA, 25 Jun 1979.

Near-surface heater tests have been conducted in two different geologic settings for argillaceous rocks. The results of these tests have provided the in situ data necessary to develop the thermomechanical models for predicting the response of argillaceous rock to thermal load representative of high-level nuclear waste. (ERA citation 04:048223)

UCRL-13766(V.2) PC **A08**/MF **A01**
Analytic Sciences Corp., Reading, MA.
Aspects of Nuclear Waste Management. Volume 2: Post-Emplacement Hazards.
B. I. Ross, L. E. Berman, M. E. Hough, and G. D. Poliak. 10 Apr 79, 159p
Contract W-7405-ENG-48

Studies of technical issues relating to nuclear waste management are described. It supplements previous TASC reports on this topic. Volume 1 addresses events occurring before emplacement of the waste in a repository. The subjects addressed are thermal analysis of interim storage accidents and doses to the worst-situated individual in all types of pre-emplacement accidents. Volume 2 deals with the possible release of waste from a geologic repository. Aspects of long-term repository performance which are discussed include water flow around shafts and boreholes and use of water from contaminated wells. New methods and results pertaining to the analysis of uncertainties in long-term risk predictions are also presented. (ERA citation 04:048224)

UCRL-15040 PC **A04**/MF **A01**
Analytic Sciences Corp., Reading, MA.
Finite Medium Green's Function Solutions to Nuclide Transport in Porous Media.
S. G. Oston. 18 Apr 79, 53p TR-1485-2
Contract W-7405-ENG-48

Current analytical techniques for predicting the transport of nuclides in porous materials center on the Green's function approach - i.e., determining the response characteristics of a geologic pathway to an impulse function input. To data, the analyses all have set the boundary conditions needed to solve the 1-D transport equation as though each pathway were infinite in length. The purpose of this work is to critically examine the effect that this infinite pathway assumption has on Green's function models of nuclide transport in porous media. The work described herein has directly attacked the more difficult problem of obtaining suitable Green's functions for finite pathways whose dimensions, in fact, may not be much greater than the diffusion length. Two different finite media Green's functions describing the nuclide mass flux have been determined, depending on whether the pathway is terminated by a high or a low flow resistance at the outlet end. Pulse shapes and peak amplitudes have been computed for each Green's function over a wide range of geohydrologic parameters. These results have been compared to both infinite and semi-infinite medium solutions. It was found that predicted pulse shapes are quite sensitive to selection of a Green's function model for short pathways only. For long pathways all models tend toward a symmetric Gaussian flux-time history at the outlet. Thus, the results of our previous waste transport studies using the infinite pathway assumption are still generally valid because they always included at least one long pathway. It was also found that finite medium models offer some unique computational advantages for evaluating nuclide transport in a series of connecting pathways. (ERA citation 04:049568)

UCRL-82174 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Rock-Melt Approach to Nuclear Waste Disposal in Geological Media.
J. J. Cohen, and T. L. Steinborn. Jan 79, 5p
CONF-781250-1
Contract W-7405-ENG-48
Science underlying waste management conference, Boston, MA, USA, 1 Dec 1978.

An unconventional method for geologic disposal of nuclear waste has been proposed. This is the rock-melt concept which calls for the direct addition of high level waste either in solution or slurry form into a deep mined cavity in silicate rock. Following the period of waste addition, the cavity is allowed to boil dry. Subsequently, the decay heat melts the waste and the surrounding rock. The molten rock dissolves the waste and the molten mixture grows, reaching its maximum radius in tens to hundreds of years. When the rate of conductive heat loss from the system exceeds that of heat input from radioactive decay, the system begins to cool and solidify. Total resolidification could require several centuries. During the period, fission products will have essentially decayed away, leaving the actinide components. The ultimate result would be the encapsulation of this radioactive material in a relatively insoluble rock matrix deep underground. (ERA citation 04:049569)

18H. Radioactivity

AEEW-R-828 PC **A02**/MF **A01**
UKAEA, Winfrith (England). Atomic Energy Establishment.
GAMSOURCE - WRS System Module Number 38474 for Calculating gamma-Ray Sources Produced by Neutron Capture.
M. J. Grimstone. Jun 78, 22p
U.S. Sales Only.

The WRS modular programming system has been developed as a means by which programmes may be more efficiently constructed, maintained and modified. In this system a module is a self-contained unit typically composed of one or more Fortran routines, and a programme is constructed from a number of such modules. This report describes one WRS module, the function of which is to calculate the source strength of gamma-rays arising from neutron capture in a system represented in one-dimensional geometry. The information given in this manual is of use both to the programmer wishing to incorporate the module in a programme, and to the user of such a programme. (Atomindex citation 10:422656)

COO-2447-6 PC **A07**/MF **A01**
Minnesota Univ., St. Paul. Dept. of Soil Science.
Behavior of Technetium-99 in Soils and Plants. Final Report, April 1, 1974--December 31, 1978.
R. G. Gast, E. R. Landa, L. J. Thorvig, D. F. Grigal, and J. C. Balogh. Jan 79, 126p
Contract EY-76-S-02-2447

Studies described in this report were aimed at establishing the magnitude and mechanisms of exp 99 Tc sorption by soils and uptake by plants. Results show that exp 99 Tc was sorbed from solution over a period to two to five weeks by 8 of 11 soils studies. The slow rate of sorption, the lack of sorption by low organic matter soils, the elimination of sorption following sterilization and increased sorption following addition of dextrose all point to a microbial role in the sorption process. However, it has not been established whether this is a direct or indirect role nor is it possible to clearly predict the conditions under which sorption will occur. Results of plant uptake studies show that exp 99 Tc can be taken up and translocated into the photosynthetic tissue of higher plants with concentrations in seeds being much less than in vegetative tissue. Technetium-99 was also shown to be toxic to plants at low concentrations and evidence suggests that this is a chemically rather than radiologically induced toxicity. However, this remains to be completely resolved as well as whether there is a threshold level of exp 99 Tc required before toxicity occurs. Studies of short-term, dynamic, aerobic systems indicated that exp 99 Tc moves through the soil as a relatively large anion exhibiting characteristic miscible displacement with some asymmetric tailing. exp 99 Tc exhibits greater retention that C1 exp - , which may be attributed statistically to weak complexion by organic matter. It is unlikely that this retention phenomenon is related to the static sorption activity reported in the first part of this study. (ERA citation 04:050581)

IEA-Pub-514 PC **A02**/MF **A01**
Instituto de Energia Atomica, Sao Paulo (Brazil). Centro de Aplicacao de Radioisotopos e Radiacao na Engenharia e na Industria.
Analysis of gamma Spectra with a HP Calculator.
H. C. Rocc. Jul 78, 11p
In Portuguese.
U.S. Sales Only.

Three programs for the analysis of gamma spectra, specially useful for neutron activation analysis, were adapted and tested. The equipment used is a Hewlett-Packard, model 9810-A desk-computer, supplied with punched tape reader, additional memory in magnetic tape and plotter, being the system capacity 111 numerical registers and 2036 programme steps. The first programme allows automatic photopeak detection in spectra up to 4096 channels, obtained with Ge(Li) detectors,generating the corresponding background radiation line. The areas and their standard deviations are calculated and the spectrum and background can be plotted. (Atomindex citation 10:449860)

LA-tr-78-69 PC **A03**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay Gif-sur-Yvette (France).
Complementary Neutron Studies About the Oklo Phenomenon.
R. Naudet. 1978, 29p CONF-771222-21(Trans)
Contract W-7405-ENG-36
C IAEA-TC--119/21.IAEA symposium on natural fission reactors, Paris, France, 19 Dec 1977.

At the colloquium of Libreville it was demonstrated that the classical methods of reactor physics were applicable to the Oklo phenomenon. The BINOCLE code, which calculates the neutron balance in a multiple environment like that of the ore at Oklo in a very detailed manner during the reaction period, was perfected. Several effects are calculated in a very detailed fashion, in particular those of the temperatures; the code was adjusted to operate with more precision and the ease of its application was improved by the addition of supplementary loops. The CRITO code calculates flux distributions and their associated characteristics in a reactor as formed by juxtaposition of different environments. Some examples of applications will be given. The spectral indices and conversion coefficients are characteristics that are available for measurements which provide information about the quantities of water present at the moment of reaction; their interpretation will be discussed. The question of reflectors, i.e., the role played by the ore with marginal uranium content surrounding the heart of the reactor, has been investigated; in particular the rapidity of decay of the neutron flux in the environments was calculated as function of their characteristics; finally, the attempt was made to correlate the distributions of measured reaction rates for a certain number of cases: section 2'P, test soundings SC 30, SC 30 a second time and SC 36; the shapes of the curves have been extremely well correlated and the role of certain parameters, like the distribution of the water or the amount of neutron contaminants present during the reaction period, can be discussed. (ERA citation 04:048158)

LA-tr-78-75 PC **A03**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France).
Geochemical Stability of Reactors: Compilation of Facts on Remobilizations of Uranium and Rare Earths.
R. Naudet. 1978, 47p CONF-771222-19(Trans)
Contract W-7405-ENG-36
C IAEA-TC--119/25.IAEA symposium on natural fission reactors, Paris, France, 19 Dec 1977.

In spite of the very remarkable stability which has been shown for uranium and rare earths in the interior of the reaction zones, there have been partial remobilizations. As for uranium, the small isotope anomalies of the edge are the effect, it seems, of the overlapping of several phenomena. The most important dates from the period of the reactions and must be attributed to convection currents moved by the releases of heat. In the period just before the present, a small fraction of the uranium of the edges was restructured into coffinite. As for the rare earths, remobilization is systematic and affects natural elements as well as fission products. It is also linked to the existence of convection currents at the time of the reactions, but it is completely unconnected with the existence of uranium. Except for Ce and Eu, a fraction of which was eliminated in the reaction zones, most are erratic short displacements on the order of a few decimeters, the effects of which were to slightly flatten the distributions and cause isotopic mixtures. The proportion of fission products carried outside the reactors is only a few percent, but contamination can still be detected several meters from the core. The migrating rare earths left the uranium either through the recoil effect, or during the reformation of pitchblende into uraninite, or through resolubilization of the uranium. They reentered the grains of uranium after recrystallization of the clays. This remobilization was accompanied by rather significant fractionation between the elements. In particular, the heavy rare earths (Gd, Dy) migrated in greater quantity and over longer distances than the light rare earths (Nd, Sm). The geochemical stability of the natural reactors, with its limits, is a fundamental problem, closely related to the problem of geochronology. The data on the remobilization of uranium and rare earths are complex and come from different sources. (ERA citation 04:052613)

UT/CES-ES-2 PC **A05**/MF **A01**
Texas Univ. at Austin. Center for Energy Studies.
Technical and Economic Evaluation of the Atmospheric Containment Technology for Radioactive Isotope Releases from Nuclear Fuel Reprocessing Plants. Environmental Study No. 2.
H. B. H. Cooper, Jr., and S. R. Gautam. Jun 78, 88p

This document is a review of technology for controlling the releases of exp 129 I, exp 85 Kr, exp 14 C, tritium, and particulate matter containing Pu and U. The methods are HgNO sub 3 + AgZeO + NaOH (Iodox) for exp 129 I, cryogenic distillation or selective fluorocarbon absorption for exp 85 Kr, caustic scrubbing for exp 14 C, and voloxidation for tritium. Removal efficiencies are 98 to 99.999%. This review determined the adequacy of the GESMO Statement in addressing the technical, economic, and time issues regarding the containment of such releases. Tritium containment is the most difficult, with the voloxidation process being expected to be fully commercialized by 1990 for new plants. Projected capital and operating costs are evaluated for the four radioisotopes and two plants (new 2,000-MT/y and existing 1,500-MT/y) at low and high efficiencies. Removal of NO sub 2 and other nonradioactive pollutants is also considered. 23 tables. (ERA citation 04:032694)

18I. Reactor Engineering and Operation

ANL-PMS-79-2(V.10) PC **A12**/MF **A01**
Argonne National Lab., IL.
World Energy Data System (WENDS). Volume X. Nuclear Facility Profiles, PO--ZA.
Jun 79, 253p
Contract W-31-109-ENG-38

In this compendium each profile of a nuclear facility is a capsule summary of pertinent facts regarding that particular installation. The facilities described include the entire fuel cycle in the broadest sense, encompassing resource recovery through waste management. Power plants and all US facilities have been excluded. To facilitate comparison the profiles have been recorded in a standard format. Because of the breadth of the undertaking some data fields do not apply to the establishment under discussion and accordingly are blank. The set of nuclear facility profiles occupies four volumes; the profiles are ordered by country name, and then by facility code. Each nuclear facility profile volume contains two complete indexes to the information. The first index aggregates the facilities alphabetically by country. It is further organized by category of facility, and then by the four-character facility code. It provides a quick summary of the nuclear energy capability or interest in each country and also an identifier, the facility code, which can be used to access the information contained in the profile. (ERA citation 04:050017)

ANL-PMS-79-2(V.11) PC **A15**/MF **A01**
Argonne National Lab., IL.
World Energy Data System (WENDS). Volume XI. Nuclear Fission Program Summaries.
Jun 79, 345p
Contract W-31-109-ENG-38

Brief management and technical summaries of nuclear fission power programs are presented for nineteen countries. The programs include the following: fuel supply, resource recovery, enrichment, fuel fabrication, light water reactors, heavy water reactors, gas cooled reactors, breeder reactors, research and test reactors, spent fuel processing, waste management, and safety and environment. (ERA citation 04:049864)

ANL-PMS-79-2(V.7) PC **A13**/MF **A01**
Argonne National Lab., IL.
World Energy Data System (WENDS). Volume VII. Nuclear Facility Profiles, AG--CH.
Jun 79, 294p
Contract W-31-109-ENG-38

In this compendium each profile of a nuclear facility is a capsule summary of pertinent facts regarding that particular installation. The facilities described include the entire fuel cycle in the broadest sense, encompassing resource recovery through waste management. Power plants and all US facilities have been excluded. To facilitate comparison the profiles have been recorded in a standard format. Because of the breadth of the undertaking some data fields do not apply to the establishment under discussion and accordingly are blank. The set of nuclear facility profiles occupies four volumes; the profiles are ordered by country name, and then by facility code. Each nuclear facility profile volume contains two complete indexes to the information. The first index aggregates the facilities alphabetically by country. It is further organized by category of facility, and then by the four-character facility code. It provides a quick summary of the nuclear energy capability or interest in each country and also an identifier, the facility code, which can be used to access the information contained in the profile. (ERA citation 04:050014)

ANL-PMS-79-2(V.8) PC **A11**/MF **A01**
Argonne National Lab., IL.
World Energy Data System (WENDS). Volume VIII. Nuclear Facility Profiles, CO--HU.
Jun 79, 234p
Contract W-31-109-ENG-38

In this compendium each profile of a nuclear facility is a capsule summary of pertinent facts regarding that particular installation. The facilities described include the entire fuel cycle in the broadest sense, encompassing resource recovery through waste management. Power plants and all US facilities have been excluded. To facilitate comparison the profiles have been recorded in a standard format. Because of the breadth of the undertaking some data fields do not apply to the establishment under discussion and accordingly are blank. The set of nuclear facility profiles occupies four volumes; the profiles are ordered by country name, and then by facility code. Each nuclear facility profile volume contains two complete indexes to the information. The first index aggregates the facilities alphabetically by country. It is further organized by category of facility, and then by the four-character facility code. It provides a quick summary of the nuclear energy capability or interest in each country and also an identifier, the facility code, which can be used to access the information contained in the profile. (ERA citation 04:050015)

ANL-PMS-79-2(V.9) PC **A12**/MF **A01**
Argonne National Lab., IL.
World Energy Data System (WENDS). Volume IX. Nuclear Facility Profiles, IN--PL.
Jun 79, 264p
Contract W-31-109-ENG-38

In this compendium each profile of a nuclear facility is a capsule summary of pertinent facts regarding that particular installation. The facilities described include the entire fuel cycle in the broadest sense, encompassing resource recovery through waste management. Power plants and all US facilities have been excluded. To facilitate comparison the profiles have been recorded in a standard format. Because of the breadth of the undertaking some data fields do not apply to the establishment under discussion and accordingly are blank. The set of nuclear facility profiles occupies four volumes; the profiles are ordered by country name, and then by facility code. Each nuclear facility profile volume contains two complete indexes to the information. The first index aggregates the facilities alphabetically by country. It is further organized by category of facility, and then by the four-character facility code. It provides a quick summary of the nuclear energy capability or interest in each country and also an identifier, the facility code, which can be used to access the information contained in the profile. (ERA citation 04:050016)

ANL-Trans-1173 PC **A02**/MF **A01**
Large Scale Primary Sodium Pumps.
J. Guidez, R. Canavelis, and P. Guilloiseau. 1977, 17p
Contract W-31-109-ENG-38
A , Houille Blanche n7/8 P719-725 1977.

A design study on primary sodium pumps for fast reactors is described. The study was performed for a 1200 MW(e) reactor with 4 pumps. (ERA citation 04:054747)

ANL-Trans-1174 PC **A02**/MF **A01**
Primary Sodium Pumps of Phenix and Superphenix.
R. Chabassier, J. Blateyron, P. Guiton, R. Canavelis, and J. Roumailhac. 1977, 20p
Contract W-31-109-ENG-38
A , Houille Blanche n7/8 P709-716 1977.

This report shows how design experience at Hispano--Suiza (SNECMA Division), Bergeron SA and the French Atomic Energy Commission has determined the hydraulic and mechanical features of the primary sodium pumps for the Phenix and Superphenix reactors. (ERA citation 04:053196)

ANL-7411(V.1)(Rev.) PC **A99**/MF **A01**
Argonne National Lab., IL.
National Energy Software Center: Compilation of Program Abstracts.
J. M. Brown, M. K. Butler, and M. M. De Bruler. May 79, 753p
Contract W-31-109-ENG-38

This is the third complete revision of program abstracts undertaken by the Center. Programs of the IBM 7040, 7090, and CDC 3600 vintage have been removed. Historical data and information on abstract format, program package contents, and subject classification are given. The following subject areas are included in the library: cross section and resonance integral calculations; spectrum calculations, generation of group constants, lattice and cell problems; static design studies; depletion, fuel management, cost analysis, and power plant economics; space-independent kinetics; space--time kinetics, coupled neutronics--hydrodynamics--thermodynamics and excursion simulations; radiological safety, hazard and accident analysis; heat transfer and fluid flow; deformation and stress distribution computations, structural analysis and engineering design studies; gamma heating and shield design; reactor systems analysis; data preparation; data management; subsidiary calculations; experimental data processing; general mathematical and computing system routines; materials; environmental and earth sciences; electronics, engi-

neering equipment, and energy systems studies; chemistry; particle accelerators and high-voltage machines; physics; magnetic fusion research; data. (ERA citation 04:052398)

ANL-7411(V.2)(Rev.) PC **A99**/MF **A01**
Argonne National Lab., IL.
National Energy Software Center: Compilation of Program Abstracts.
J. M. Brown, M. K. Butler, and M. M. De Bruler.
May 79, 700p
Contract W-31-109-ENG-38

This volume contains the remaining program abstracts, along with a listing of the library programs by subject classification and a KWIC index. (ERA citation 04:052399)

ANL-79-60 PC **A03**/MF **A01**
Argonne National Lab., IL.
Nondestructive Assay System for Use in Decommissioning a Plutonium-Handling Facility.
C. T. Roche, J. J. Vronich, F. O. Bellinger, and R. B. Perry. Jul 79, 30p
Contract W-31-109-ENG-38

Argonne National Laboratory is decommissioning a facility used to fabricate reactor fuel elements. The equipment is contaminated with alpha emitters at levels up to 10 exp 12 dpm/100 cm exp 2 . The objective of decontamination is to reduce the TRU concentrations below 10 nCi/g of waste. A portable NDA procedure using NaI(T1) gamma-spectrometric techniques was selected to measure the residual Pu and exp 241 Am in the glove boxes. Assays were performed at different stages in the decontamination process to estimate the detection system sensitivity and the effectiveness of the cleaning efforts. (ERA citation 04:052612)

BAW-1519 PC **A03**/MF **A01**
Babcock and Wilcox Co., Lynchburg, VA.
Post-Irradiation Examination of Oconee 1 Fuel: Cycle 1 Nondestructive Test Phase.
Jun 79, 43p
Contract ET-78-C-02-4711

Standard B and W pressurized water reactor fuel was examined after one cycle of irradiation in the Oconee 1 reactor. The examination was conducted in the Oconee Units 1 and 2 spent fuel storage pool using underwater test equipment. Data obtained included spring constants, rod and assembly dimensional changes, crud analysis, and fuel column axial gap and stack lengths. Parametric changes generally were well within the design envelope. The 36 assemblies that were visually examined were structurally sound and showed no evidence of cocked grids, fretting, or visually observable rod bowing. The only exception was two isolated cases of rod defects. (ERA citation 04:053164)

BNL-NUREG-25493 PC **A03**/MF **A01**
Brookhaven National Lab., Upton, NY.
Analysis of the FFTF Primary Pipe Rupture Transients.
K. R. Perkins, R. A. Bari, L. C. Chen, and D. C. Albright. 1979, 26p CONF-790816-6
Contract EY-76-C-02-0016
International meeting on fast reactor safety technology, Seattle, WA, USA, 19 Aug 1979.

The response of the Fast Flux Test Facility (FFTF) to hypothetical ruptures of the high pressure primary piping has been analyzed using two LMFBR plant systems codes, namely IANUS and DEMO. Comparisons of the average channel temperatures predicted by the two codes show good agreement for identical transients. However, the hot channel temperatures predicted by DEMO are about 60K higher than the corresponding IANUS predictions for severe transients. This difference is attributed to the dynamic hot channel factors employed in DEMO which discount the thermal inertia of the duct walls for rapid transients. DEMO also predicts more severe transients for hot-leg ruptures in FFTF than previously reported analyses for the CRBR. (ERA citation 04:048686)

BNL-NUREG-25522 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Containment Response to Postulated Ex-Vessel Core Meltdown Accidents in the Fast Flux Test Facility.
W. T. Pratt, R. D. Gasser, and A. R. Marchese. 1979, 12p CONF-790816-1
Contract EY-76-C-02-0016
International meeting on fast reactor safety technology, Seattle, WA, USA, 19 Aug 1979.

An evaluation of the containment response to ex-vessel core meltdown accidents in the Fast Flux Test Facility is discussed. Particular attention is given to the possibility of the molten fuel/steel mixture remaining in a molten form after entering the reactor cavity. For the molten pool configurations considered, significant H sub 2 concentrations were reached in the RCB before the reactor cavity floor was penetrated. The melt-front impacts the pressure transient, not through gas generation, but through penetration into the unlined subcavity resulting in an enhanced sodium-concrete reaction. Hence, if H sub 2 recombination is neglected, then steps would have to be taken to decrease the H sub 2 concentration before the RCB design ressure is reached. (ERA citation 04:048687)

BNL-NUREG-25845 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Three-Dimensional Computer Code for the Nonlinear Dynamic Response of an HTGR Core.
M. Subudhi, L. Lasker, B. Koplik, J. Curreri, and H. Goradia. 1979, 8p CONF-790802-8
Contract EY-76-C-02-0016
International conference on structural mechanics in reactor technology, Berlin, F.R. Germany, 13 Aug 1979.

A three-dimensional dynamic code has been developed to determine the nonlinear response of an HTGR core. The HTGR core consists of several thousands of hexagonal core blocks. These are arranged inlayers stacked together. Each layer contains many core blocks surrounded on their outer periphery by reflector blocks. The entire assembly is contained within a prestressed concrete reactor vessel. Gaps exist between adjacent blocks in any horizontal plane. Each core block in a given layer is connected to the blocks directly above and below it via three dowell pins. The present analystical study is directed towards an invesstigation of the nonlinear response of the reactor core blocks in the event of a seismic occurrence. The computer code is developed for a specific mathemtical model which represents a vertical arrangement of layers of blocks. This comprises a block module of core elements which would be obtained by cutting a cylindrical portion consisting of seven fuel blocks per layer. It is anticipated that a number of such modules properly arranged could represent the entire core. Hence, the predicted response of this module would exhibit the response characteristics of the core. (ERA citation 04:048689)

BNL-NUREG-25947 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Failure Analysis of Tubes with Wastages.
S. Prachuktam, M. Reich, and J. Rajan. 1979, 8p CONF-790615-21
Contract EY-76-C-02-0016
US national congress on pressure vessels and piping, San Francisco, CA, USA, 25 Jun 1979.

A finite element method for large strain calculation using the constitutive relation due to Hill was developed. This constitutive relation relates the corotational rate of the Kirchoff stress and deformation rate tensor which leads to a symmetric structure stiffness. This method is used to calculate failure pressures of degraded tubes. (ERA citation 04:053165)

CAAP-TR-047 PC **A06**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
Preliminary Application of Quantitative Assessment Procedure. Interim Report.
J. A. Dearien, and C. B. Davis. Apr 79, 111p
Contract EY-76-C-07-1570

A procedure has been developed to quantify the results of code assessment and relate this quantified result to the percentage of knowledgeable analysts who would be expected to find the code acceptable. The quantification procedure was applied to two PWR loss of coolant Semiscale tests and the results of the assessment process indicate that 50% to 70% of knowledgeable analysts would find the code results an acceptable representation of the experimental data. The results are preliminary due to the limited amount of data at present but are very encouraging with respect to future application of the procedure. (ERA citation 04:051659)

CAAP-TR-052 PC **A03**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
Pretest Prediction of Semiscale Test S-07-10 B.
C. A. Dobbe. Jun 79, 41p
Contract EY-76-C-07-1570

A best estimate prediction of Semiscale Test S-07-10B was performed at INEL by EG and G Idaho as part of the RELAP4/MOD6 code assessment effort and as the Nuclear Regulatory Commission pretest calculation for the Small Break Experiment. The RELAP4/MOD6 Update 4 and the RELAP4/MOD7 computer codes were used to analyze Semiscale Test S-07-10B, a 10% communicative cold leg break experiment. The Semiscale Mod-3 system utilized an electrially heated simulated core operating at a power level of 1.94 MW. The initial system pressure and temperature in the upper plenum was 2276 psia and 604 exp 0 F, respectively. (ERA citation 04:048690)

CDAP-TR-056 PC **A03**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
Code Development and Analysis Program: Cladding Mechanical Limits (CMLIMT).
D. L. Hagrman. May 79, 49p
Contract EY-76-C-07-1570

Revised models are described for cladding mechanical limits. The update incorporates important new data from several Nuclear Regulatory Commission and German experimental programs and defines a single physically reasonable failure criterion for cladding under tensile stress. Alternate simplified expressions are also derived for use in obtaining estimates of typical cladding shape after burst. (ERA citation 04:048549)

CEA-N-2027 PC **A07**/MF **A01**
CEA Centre d'Etudes Nucleaires de Cadarache, Saint-Paul-les-Durance (France). Dept. des Reacteurs a Eau.
Axial Simulation for the Core of a Pressurized Water-Cooled Reactor and Application About the Shim Rod Follow-Up.
M. de Peretti. May 78, 133p
In French.Thesis.
U.S. Sales Only.

The computer programme which has been developed takes temperature effects into account for load following and simulates the core behavior of a pressurized water-cooled reactor using control rods and soluble boron. The programme has been applied to a medium powered heating installation to which a new type of control rod (grey rods) has been designed to limit the discharge of liquid effluents. Finally, in order to investigate the use of these rods in the more demanding case of power stations (more rapid load following), it was shown that not only was the flexibility of the power station improved, but that this was accompanied by an important reduction in effluent. (Atomindex citation 10:449508)

CEGB-RD/B/N-4388 PC **A03**/MF **A01**
Central Electricity Generating Board, Berkeley (England). Berkeley Nuclear Labs.
Commissioning of the Jet-in-Pool Sodium Experiment.
A. G. Morss. Oct 78, 32p
U.S. Sales Only.

A sodium facility which has been built to examine the temperature distribution through a recirculating flow regime is described. This experiment, the so called 'jet-in-pool' experiments, forms part of a programme of work at BNL aimed at investigating thermal similarity between sodium and water. The objective of the programme is to establish the range of validity for using water models to simulate liquid sodium reactors. The facility is not yet fully operational due to some problems with the air-blast cooler, but the commissioning programme carried out to date has been very successful. The

techniques used to ensure the accurate measurement of sodium temperature and flow are described. The design of the 90 kW heater in use on this facility is also discussed. Some initial experimental data is presented but due to the cooler problems the results are not yet suitable for comparing with water. However, it is concluded that the facility and the installed instrumentation are capable of obtaining the required experimental accuracy and that once the loop is fully operational the experimental objectives should be realised. (Atomindex citation 10:449685)

CONF-790363-2 PC **A02**/MF **A01**
Westinghouse Electric Corp., Madison, PA. Advanced Reactors Div.
Evaluation of the Influence of Seismic Restraint Characteristics on LMFBR Piping.
R. H. Mallett. 1979, 21p
Contract EY-76-C-15-2395
US Japan specialist meeting on high temperature piping design and analysis, Pittsburgh, PA, USA, 26 Mar 1979.

For the Clinch River Breeder Reactor Plant (CRBRP) heat transport system piping within the reactor containment building, dynamic analyses of the piping loops have been performed to study the effect of restraint stiffness on the dynamic behavior of the piping, i.e., changes in frequencies, mode shapes, loads, stresses, and displacements. In addition, analysis and testing of typical CRBRP restraint system components have been performed for the purpose of quantifying and verifying the basic characteristics of the restraints used in the piping system dynamic analysis. The results are presented of the analysis and testing described above. In particular, it is shown that piping restraint effects on breeder reactor piping response are important considerations in the design/analysis process. (ERA citation 04:049905)

CONF-790363-3 PC **A02**/MF **A01**
Westinghouse Electric Corp., Madison, PA. Advanced Reactors Div.
Load-Time Histogram and Elastic Analysis of CRBRP Heat Transport System Piping.
R. M. Mello. 1979, 21p
Contract EY-76-C-15-2395
US Japan specialist meeting on high temperature piping design and analysis, Pittsburgh, PA, USA, 26 Mar 1979.

The CRBRP heat transport system piping was designed and analyzed for the operating and load conditions as specified in the Piping Design Specification. The various types of design loading conditions have been categorized into design, normal, upset, emergency and faulted conditions, and organized into a load histogram. Using the thermal transient defined for each condition and the histogram, a set of load cycles was constructed using the 863 startup-shutdown conditions. The stress analysis of the piping was performed on the basis of the thermal transients and loadings resulting from the loading categories and the histogram. The ELTEMP computer program was used to perform the elastic ASME Code compliance analysis. The input required to perform the Code evaluation included the pipe cross-section geometry, component type (elbow, tee, straight, etc.), the forces and moments output data from the flexibility analyses, average temperature, linear temperature gradients, non-linear temperature gradients, pressure, etc. (ERA citation 04:049906)

CONF-790363-4 PC **A02**/MF **A01**
Westinghouse Electric Corp., Madison, PA. Advanced Reactors Div.
Application of ASME Code Case N-47 Concepts to CRBRP Primary Piping.
R. H. Mallett. 1979, 22p
Contract EY-76-C-15-2395
US Japan specialist meeting on high temperature piping design and analysis, Pittsburgh, PA, USA, 26 Mar 1979, Portions of document are illegible.

Section III of the ASME Code provides rules in Subsection NB-3600 which greatly simplify the structural evaluation of piping. The key to this simplification is in the use of stress analysis formulas based upon stress indices. These formulas are applicable in the evaluation of compliance with limits on elastically calculated quantities. At present, Code Case N-47 permits, but does not specify, the use of analyses based upon piping stress indices. This paper describes a set of formulas for piping analysis using stress indices. Specifically, stress intensities needed for evaluation of compliance with Code Case N-47 limits on elastically calculated are given using piping stress indices. The specified formulas are examined by comparison with related ANSI B31.1 rules and test data. (ERA citation 04:049907)

CONF-790423-15 PC **A02**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
Performance Evaluation of a Drag-Disc Turbine Transducer and Three-Beam gamma Densitometer under Transient Two-Phase Flow Conditions.
C. L. Nalezny, L. L. Chen, and C. W. Solbrig.
1979, 19p
Contract EY-76-C-07-1570
Multiphase flow and heat transfer symposium workshop, Miami Beach, FL, USA, 16 Apr 1979.

One of the primary variables measured in the Loss-of-Fluid Test (LOFT) Program is mass flow rate. LOFT uses drag-disc turbine tranducers (DTT) and a three-beam gamma densitometer to measure parameters from which mass flow may be computed. The transducer combination was performance tested under transient conditions in the blowdown loop at the LOFT Test Support Facility (LTSF). The performance tests consisted of three partial blowdowns of different durations starting from the same initial conditions. The reference mean mass flow rate was determined by measuring the amount of water required to reestablish initial conditions after each partial blowdown. The average mass flow rates computed from the output of the drag disc, turbine, and gamma densitometer were compared to the reference mean mass flow rates over three blowdown intervals. The tests indicated that the equal phase velocity mass measurement model provided excellent results through the use of the turbine and densitometer, and drag disc and densitometer when the phase velocities were nearly equal. (ERA citation 04:053215)

CONF-790441-8 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
ANS-5.4 Fission Gas Release Model. III. Low Temperature Release.
R. A. Lorenz. 1979, 10p
Contract W-7405-ENG-26
ANS topical meeting on light water reactor fuel performance, Portland, OR, USA, 29 Apr 1979.

A comittee of the American Nuclear Society, the ANS 5.4 Working Group, has formulated models for the release of fission gas from light water reactor (LWR) fuel operating at low temperature. The model for the release of stable fission gas and exp 85 Kr shows (as the data from which it was derived) that the fractional release at 30,000 to 35,000 MWd/MT should be less than 0.5% as long as the peak centerline temperature remains sufficiently low. A second model is used to calculate the release of shorter half-life isotopes that reach production-decay equilibrium. (ERA citation 04:053159)

CONF-790572-1 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Core Flow Test Loop (CFTL) Program.
U. Gat, and A. G. Grindell. 1979, 28p
Contract W-7405-ENG-26
Helium Breeder Associates/US Dept of Energy GCFR technical meeting, San Diego, CA, USA, 30 May 1979.

The Core Flow Test Loop (CFTL) is the out-of-pile thermohydraulic and structural test bed for the Gas-Cooled Fast Reactor (GCFR) core assemblies. The assemblies are simulated with appropriately configured bundles of electrically heated rods called fuel and blanket rod simulators (FRS and BRS). The FRS and BRS which simulate accurately the GCFR fuel and blanket rods from the cladding outward have internal thermocouples to measure the cladding temperaure. (ERA citation 04:046450)

CONF-790572-2 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
PCRV Design Verifiction and Support at Oak Ridge National Laboratory.
J. P. Callahan. 1979, 23p
Contract W-7405-ENG-26
Helium Breeder Associates/US Dept of Energy GCFR technical meeting, San Diego, CA, USA, 30 May 1979.

For more than a decade, a comprehensive program of analytical and experimental studies of prestressed concrete reactor vessels (PCRVs) and related technology has been conducted at Oak Ridge National Laboratory (ORNL) under the auspices of the Department of Energy and its predecessors. The program has been directed primarily toward gas-cooled reactors since they are the only reactor concepts utilizing PCRVs. The goals of the program are to provide technical support for ongoing PCRV design activities, contribute to the technological data base, and provide independent review and evaluation of the relevant technology. The tasks selected for implementation are identified through direct communication with the PCRV designers, through participation in ACI-ASME design code activities and based on the findings of literature reviews and communications with researchers in other countries. Current areas of study encompass analysis methods, materials properties, instrumentation, and structural models. Although the major portion of the overall effort is supported by the HTGR Base Technology Program, the task areas are generic in nature and are therefore relevant to the GCFR as well. (ERA citation 04:048580)

CONF-790572-3 PC **A02**/MF **A01**
Argonne National Lab., IL.
GCFR Fuels and Materials Program at Argonne National Laboratory.
L. A. Neimark, S. Greenberg, C. E. Johnson, A. Purohit, and Y. Y. Liu. 1979, 19p
Contract W-31-109-ENG-38
Helium Breeder Associates/US Dept of Energy GCFR technical meeting, San Diego, CA, USA, 30 May 1979.

The F-5 fuel-pin irradiation experiment in EBR-II is a cornerstone of the GCFR program. It is the largest-scale fuel-pin experiment in the present program and will provide data on the performance of pins and a pin-support structure that are prototypic of the GCFR Demonstration Plant. The fuel pins are presently undergoing interim examination after successfully achieving 4.6 at.% burnup. Studies of the thermodynamics and kinetics of the U–Cs–O system, supplemented by analysis of the results of previously irradiated fuel pins, have led to the incorporation of fuel-design modifications in the F-5 experiment to insure adequate performance of the vented fuel. The effect of ribbing, as well as the ribbing process, on the short- and long-term structural performance of fuel-pin cladding is being evaluated via in-reactor and out-of-reactor tests and with the fuel-element modeling code LIFE-GCFR and the finite element program, ADINA. (ERA citation 04:053173)

CONF-790602-56 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Fission Product Release During LWR Loss-of-Coolant Accidents.
A. P. Malinauskas, R. A. Lorenz, and J. L. Collins. 1979, 5p
Contract W-7405-ENG-26
ANS annual meeting, Atlanta, GA, USA, 3 Jun 1979.

Experiments performed at Oak Ridge National Laboratory with fission product simulants and with irradiated light water reactor (LWR) fuel have been employed to develop semiempirical models of fission product release from defected LWR fuel rods. At fuel temperatures less than 1200 exp 0 C, releases of semivolatile species are postulated to result from two mechanisms. The first of these, a burst release mechanism, is due to the transport of the fill and fission product gases as they are vented through the cladding defect. The second mode, diffusional release, is described as the migration of the fission products through the interconnected voids (e.g., the fuel-cladding gap) due to ordinary gas-phase diffusion. The two mechanisms are further assumed to be additive. Releases calculated by these models are presented. (ERA citation 04:046625)

CONF-790615-16 PC **A03**/MF **A01**
Westinghouse Electric Corp., Madison, PA. Advanced Reactors Div.

Design Considerations for CRBRP Heat Transport System Piping Operating at Elevated Temperatures.
L. P. Pollono, and R. M. Mello. 1979, 27p
Contract EY-76-C-15-2395
US national congress on pressure vessels and piping, San Francisco, CA, USA, 25 Jun 1979.

The heat transport system sodium piping for the Clinch River Breeder Reactor Plant (CRBRP) within the reactor containment building must withstand high temperatures for long periods of time. Each phase of the mechanical design process of the piping system is influenced by elevated temperature considerations which include material thermal creep effects, ratchetting caused by rapid temperature transients and stress relaxation, and material degradation effects. The structural design philosophy taken to design the CRBRP piping operating in a high temperature environment is described. The resulting design of the heat transport system piping is presented along with a discussion of special features that resulted from the elevated temperature considerations. (ERA citation 04:049908)

CONF-790646-6 PC **A02**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
Overview of the LOFT Experimental Program.
J. D. Burtt. 1979, 13p
Contract EY-76-C-07-1570
International colloquium on irradiation for reactor safety programmes, Petten, Netherlands, 25 Jun 1979.

The Loss-of-Fluid Test (LOFT) facility, operated by EG and G Idaho, Inc., for the US Nuclear Regulatory Commission, is designed as an integral test facility to study the behavior of commercial pressurized water reactors (PWRs) during a loss-of-coolant accident (LOCA). For this mission, six nuclear and one nonnuclear test series have been proposed to provide data on PWR transient behavior, but plans must be recognized as tentative and subject to change for a number of reasons. The Nonnuclear Test Series, completed in April 1976, consisted of six loss-of-coolant experiments (LOCEs) performed with isothermal primary coolant temperatures. The Power Ascension Test Series, Series L2, proposes five LOCEs, simulating double-ended cold leg breaks (DECLB), to provide a controlled power escalation to a peak power of 52.49 kW/m. The Small and Intermediate Breaks Test Series, Series L3, will consist of three LOCEs designed to study the effects of smaller primary coolant system ruptures. These tests will be initiated by cold leg ruptures ranging from scaled 6.4-cm pipe ruptures to scaled 0.05-m exp 2 pipe cracks. Five LOCEs are proposed for the Alternate Emergency Core Cooling Systems (ECCS) Test Series, designated Series L4. These DECLBs will be used to study systems such as lower plenum emergency core coolant injection, hot leg injection, and combined hot and cold leg injection. Also included in the L4 series is a test involving upper plenum-downcomer pressure equalization valves. The Hot Leg Rupture Test Series, Series L5, will study PWR behavior during a double-ended hot leg rupture. (ERA citation 04:050037)

CONF-790655-5 PC **A04**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
Drag Devices for Two-Phase Mass Flow Measurements.
J. L. Anderson. 1979, 63p
Contract EY-76-C-07-1570
Colloquium on two-phase instrumentation, Idaho Falls, ID, USA, 11 Jun 1979.

Results are presented from testing a number of full flow drag devices in steady state air--water mixtures, transient steam--water mixtures, and Semiscale Mod-3 Test S-07-8 for obtaining two-phase mass flow measurements. Modeling methods for obtaining mass flow rates are discussed along with the effects of two-phase flows on the drag coefficient of full flow multihole drag plates. (ERA citation 04:051450)

CONF-790707-17 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Real Time Material Accountability in a Chemical Reprocessing Unit.
G. W. Morrison, and E. D. Blakeman. 1979, 11p
Contract W-7405-ENG-26
20. annual meeting of the Institute of Nuclear Materials Management, Albuquerque, NM, USA, 16 Jul 1979.

Real time material accountability for a pulse column in a chemical reprocessing plant has been investigated using a simple two state Kalman Filter. Operation of the pulse column was simulated by the SEPHIS-MOD4 code. Noisy measurements of the column inventory were obtained from two neutron detectors with various simulated counting errors. Various loss scenarios were simulated and analyzed by the Kalman Filter. In all cases considered the Kalman Filter was a superior estimator of material loss. (ERA citation 04:051180)

CONF-790707-22 PC **A02**/MF **A01**
Allied Chemical Corp., Idaho Falls, ID. Idaho Chemical Programs - Operations Office.
Material Control Test and Evaluation System at the ICPP.
C. E. Johnson. 1979, 13p
Contract EY-76-C-07-1570
20. annual meeting of the Institute of Nuclear Materials Management, Albuquerque, NM, USA, 16 Jul 1979.

The US DOE is evaluating process monitoring as part of a total nuclear material safeguards system. A monitoring system is being installed at the Idaho Chemical Processing Plant to test and evaluate material control and surveillance concepts in an operating nuclear fuel reprocessing plant. Process monitoring for nuclear material control complements conventional safeguards accountability and physical protection to assure adherence to approved safeguards procedures and verify containment of nuclear materials within the processing plant. (ERA citation 04:051181)

CONF-790707-23 PC **A02**/MF **A01**
Allied Chemical Corp., Idaho Falls, ID. Idaho Chemical Programs - Operations Office.
Applying New Safeguards Technology to Existing Nuclear Facilities.
W. J. Harris, and E. P. Wagner. 1979, 17p
Contract EY-76-C-07-1570
20. annual meeting of the Institute of Nuclear Materials Management, Albuquerque, NM, USA, 16 Jul 1979.

The application and operation of safeguards instrumentation in a facility containing special nuclear material is most successful when the installation is desinged for the operation of the specific facility. Experience at the Idaho National Engineering Laboratory demonstrates that installation designs must consider both safeguards and production requirements of specific facilities. Equipment selection and installation design influenced by the training and experience of production operations and safeguards personnel at a specific facility help assure successful installation, reliable operation, and minimal operator training. This minimizes impacts on existing plant production activities while maximizing utility of the safeguards information obtained. (ERA citation 04:051182)

CONF-790731-1 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Charged Particle Irradiations in the United States Breeder Reactor Program.
A. F. Rowcliffe, E. H. Lee, and P. S. Sklad. 1979, 24p
Contract W-7405-ENG-26
US/USSR breeder reactor core materials information exchange meeting, Richland, WA, USA, Jul 1979.

Charged particle irradiations used as a means of studying radiation damage in materials of interest in the US Breeder Reactor Program are reviewed. (ERA citation 04:049909)

CONF-790745-1 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Two-Phase Flow Measurements with Advanced Instrumented Spool Pieces and Local Conductivity Probes.
K. G. Turnage, and C. E. Davis. 1979, 33p
Contract W-7405-ENG-26
Reactor Safety Instrumentation Review Group meeting, Silver Spring, MD, USA, 24 Jul 1979.

A series of two-phase, air-water and steam-water tests performed with instrumented spool pieces and with conductivity probes obtained from Atomic Energy of Canada, Ltd. is described. The behavior of the three-beam densitometer, turbine meter, and drag flowmeter is discussed in terms of two-phase models. Application of some two-phase mass flow models to the recorded spool piece data is made and preliminary results are shown. Velocity and void fraction information derived from the conductivity probes is presented and compared to velocities and void fractions obtained using the spool piece instrumentation. (ERA citation 04:051660)

CONF-790745-2 PC **A03**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
Horizontal Two-Phase Flow Transit Time Measurements.
A. G. Baker. 1979, 27p
Contract EY-76-C-07-1570
Reactor Safety Instrumentation Review Group meeting, Silver Spring, MD, USA, 24 Jul 1979.

A transit time flowmeter (TTF) indirectly determines fluid velocity by measuring the time of transit of the fluid between two sensors of known separation. The transit time is obtained by cross-correlation, and the velocity by dividing the intersensor separation distance by the transit time. Various sensors were tested for suitability. Performance was determined by comparison of the TTF velocity to that computed from or indicated by the instrumentation of the test facilities. Conductivity probes, single-beam gamma densitometers, and Pitot tubes were tested in steady state air-water conditions. The densitometers performed best, followed by the conductivity probes and the Pitot tubes. Stratification effects were detected in this horizontal flow application which confuse a straightforward interpretation of the TTF velocity. (ERA citation 04:051553)

CONF-790802-43 PC **A02**/MF **A01**
O'Donnell and Associates, Inc., Pittsburgh, PA.
Creep Ratcheting Bounds from Extended Elastic Core Concept.
J. S. Porowski, and W. J. O'Donnell. 1979, 18p
Contract W-7405-ENG-26
International conference on structural mechanics in reactor technology, Berlin, F.R. Germany, 13 Aug 1979.

The concept of an elastic core near the middle of the wall at any location in a component subjected to cyclic loading in the presence of creep was introduced by the authors to obtain bounds on the creep ratcheting strains at that location. The concept was quite useful since only elastic and creep strains could occur in the elastic core. Detailed solutions were obtained for elastic-perfectly plastic cylinders subjected to internal pressure and cyclic thru-the-wall thermal stresses. The present work includes isotropic and/or kinematic hardening effects and arbitrary temperature dependence of the yield strength of the material. The application of the bounds is extended to include loading histories with severe cycles resulting in plastic ratcheting. In general the relaxation of thermal stresses may result in a net accumulation of strain. The commonly used solution for complete relaxation between cycles does not include enhanced creep effects, and the latter are significant in many design applications. (ERA citation 04:054756)

CONF-790802-44 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Test of the Second Model of the GCFR Steam Generator Cavity Closure Plug.
J. P. Callahan, G. C. Robinson, and W. G. Dodge. 1979, 18p
Contract W-7405-ENG-26
International conference on structural mechanics in reactor technology, Berlin, F.R. Germany, 13 Aug 1979.

As part of its participation in the program to develop a 300 MW(e) gas-cooled fast reactor (GCFR) demonstration power plant, the Oak Ridge National Laboratory (ORNL) is conducting a series of structural model tests. One of the tasks of the ORNL effort provides for the design, analysis and/or testing of small-scale models of the PCRV penetration closure plugs. The principal objectives are to determine structural response of the plugs to

normal operating pressures and to substantial overpressurization. The tests also provide reliable data for verification of analysis methods. Included in the testing program are models of both the steam generator cavity closure and central core cavity closure plugs. Thus far, two models of the steam generator cavity closure series have been tested. The first model which represented the original GA design was pressurized to 75.8 MPa (11,000 psi) without sustaining cracking of the concrete or failure of the plug although yielding of the metallic components was recorded by attached strain gages. (ERA citation 04:053174)

CONF-790802-46 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Grouted and Nongrouted Tendons for Prestressed Concrete Pressure Vessels.
D. J. Naus. 1979, 9p
Contract W-7405-ENG-26
International conference on structural mechanics in reactor technology, Berlin, F.R. Germany, 13 Aug 1979.

A model study was conducted under the Prestressed Concrete Pressure Vessel (PCPV) Program at the Oak Ridge National Laboratory (ORNL) to appraise grouted and nongrouted tendon systems for PCPV application. Results are presented for the experimental portion of the investigation which was conducted in four phases: (1) grouted--nongrouted tendon behavior, (2) potential new materials for PCPV applications, (3) effectiveness of organic petrolatum-based and portland cement corrosion inhibitors, and (4) acoustic emission as a technique for PCPV structural integrity monitoring. (ERA citation 04:053203)

CONF-790816-12 PC **A02**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
Dual Change-of-Phase in Forced Flow on a Finite Wall, with Application to SLSF Safety Analysis.
M. S. El-Genk, and R. L. Moore. 1979, 11p
Contract EY-76-C-07-1570
International meeting on fast reactor safety technology, Seattle, WA, USA, 19 Aug 1979.

An important study related to the safety analysis of Liquid Metal Fast Breeder Reactors (LMFBRs) is to understand the phenomena of molten fuel relocation and refreezing on the core cold structures following a hypothesized loss-of-flow accident (LOFA). An assessment of molten fuel containment capability for the Sodium Loop Safety Facility (SLSF) in-pile experiments following a postulated LOFA is presented, considering the conditions of molten fuel flow, simultaneous melting in the outer duct wall, and convective cooling at the outer surface of the wall due to sodium coolant bypass flow. (ERA citation 04:050038)

CONF-790816-19 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Analysis of Sodium Valve Reliability Data at CREDO.
T. F. Bott, and P. M. Haas. 1979, 13p
Contract W-7405-ENG-26
International meeting on fast reactor safety technology, Seattle, WA, USA, 19 Aug 1979.

The Centralized Reliability Data Organization (CREDO) has been established at Oak Ridge National Laboratory (ORNL) by the Department of Energy to provide a centralized source of data for reliability/maintainabilty analysis of advanced reactor systems. The current schedule calls for development of the data system at a moderate pace, with the first major distribution of data in late FY-1980. Continuous long-term collection of engineering, operating, and event data has been initiated at EBR-II and FFTF. (ERA citation 04:053175)

CONF-790816-22 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Evaluation of COBRA III-C and SABRE-I (Wire Wrap Version) Computational Results by Comparison with Steady-State Data from a 19-Pin Internally Guard Heated Sodium Cooled Bundle with a Six-Channel Central Blockage (THORS Bundle 3C).
J. F. Dearing, S. D. Rose, and W. R. Nelson. 1979, 17p
Contract W-7405-ENG-26
International meeting on fast reactor safety technology, Seattle, WA, USA, 19 Aug 1979.

The predicted computational results of two well-known sub-channel analysis codes, COBRA-III-C and SABRE-I (wire wrap version), have been evaluated by comparison with steady state temperature data from the THORS Facility at ORNL. Both codes give good predictions of transverse and axial temperatures when compared with wire wrap thermocouple data. The crossflow velocity profiles predicted by these codes are similar which is encouraging since the wire wrap models are based on different assumptions. (ERA citation 04:053176)

CONF-790816-24 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
THORS: A High-Temperature Sodium Test Facility Rated at 2.0 MW.
P. A. Gnadt, A. H. Anderson, N. E. Clapp, B. H. Montgomery, and C. W. Collins. 1979, 12p
Contract W-7405-ENG-26
International meeting on fast reactor safety technology, Seattle, WA, USA, 19 Aug 1979.

The Thermal--Hydraulic Out-of-Reactor Safety (THORS) facility at Oak Ridge Naitonal Laboratory (ORNL) is a high-temperature sodium test facility operated for the United States Breeder Reactor Safety Program. The facility is primarily used for testing large simulated Liquid-Metal Fast Breeder Reactor (LMFBR) fuel subassemblies. The facility has recently been upgraded to provide a 2.0-MW test bundle power input and heat removal capability. A new test section, which will be capable of operating at 980 exp 0 C and which will accommodate a 217-pin bundle, has also been added. A 61-pin bundle is currently under test in the facility. A description of the test facility is presented, along with a brief summary of the 8-year operating history of this safety-related test facility. (ERA citation 04:053177)

CONF-790816-30 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Analysis of the Heat and Mass Transfer Processes of UO sub 2 Bubble in Sodium.
M. L. Tobias. 1979, 6p
Contract W-7405-ENG-26
International meeting on fast reactor safety technology, Seattle, WA, USA, 19 Aug 1979.

The anticipated behavior of uranium oxide vapor bubbles produced by the capacitor discharge vaporization (CDV) method in the Fuel Aerosol Simulant Test (FAST) Facility is discussed on the basis of relatively simple physical models. Results of calculations for the rate of bubble rise and for heat and mass transfer rates are presented. Parametric studies indicate that future analysis efforts should emphasize the diffusion condensation process and the loss of heat from the bubble by radiation. Transfer of heat in the surrounding sodium is rapid enough that simplified models should be adequate. No important effects were noted in connection with bubble depth, initial quantity of UO sub 2 , or initial superheat. (ERA citation 04:053236)

CONF-790816-31 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
SAS3A Analysis of Natural Convection Boiling Behavior in the Sodium Boiling Test Facility.
G. A. Klein. 1979, 8p
Contract W-7405-ENG-26
International meeting on fast reactor safety technology, Seattle, WA, USA, 19 Aug 1979.

An analysis of natural convection boiling behavior in the Sodium Boiling Test (SBT) Facility has been performed using the SAS3A computer code. The predictions from this analysis indicate that stable boiling can be achieved for extensive periods of time for channel powers less than 1.4 kW and indicate intermittent dryout at higher powers up to at least 1.7 kW. The results of this anaysis are in reasonable agreement with the SBT Facility test results. (ERA citation 04:053237)

CONF-790816-32 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Sodium Boiling Incoherence in a 19-Pin Wire-Wrapped Bundle.
J. L. Wantland, P. W. Garrison, W. R. Nelson, J. F. Dearing, and P. A. Gnadt. 1979, 9p
Contract W-7405-ENG-26
International meeting on fast reactor safety technology, Seattle, WA, USA, 19 Aug 1979.

During various flow transients in a sodium-cooled reactor, localized boiling can occur. If this boiling does not result in dryout, significant reactor core damage is not likely. A full-length electrically heated 19-pin bundle was used to determine the extent to which dynamic boiling can be sustained before dryout occurs. Over 30 boiling runs were made with runs at three flow-power conditions culminating in dryout. Continuous boiling for time periods exceeding 20 sec was observed. Preliminary data analysis suggested that thermal inertia of the duct walls, which were backed with thermal insulation, was higher than designed and was contributing to boiling incoherence. Posttest examination confirmed that the insulation annulus had become permeated with sodium, resulting in a significantly increased thermal inertia. Detailed comparisons of experimental results with the results of several different analytical techniques indicate that incoherent boiling caused by bundle thermal inertia was responsible for the long time periods between boiling inception and dryout. This suggests that thermal inertia designed into the reactor core could prevent or delay core damage during various flow-power mismatch transients. (ERA citation 04:053238)

CONF-790905-1 PC **A02**/MF **A01**
Westinghouse Electric Corp., Madison, PA. Advanced Reactors Div.
Re-Evaluating Your Nuclear Program Needs: How to Benefit from Your Vendor's Q.A. Program.
A. E. Cocoros. 1979, 22p
Contract EY-76-C-15-2395
American Society for Quality Control conference, Las Vegas, NV, USA, 24 Sep 1979.

The quality assurance component control and verification program to be presented provides a cost effective approach to monitoring and controling the implementation of the design, fabrication, inspection and shipping plans of a supplier. It attempts to coordinate and integrate quality control and verification effort of a supplier with the control and verification effort of the purchaser to obtain a composite which accomplishes a total need. Based on the competency and capabilities of the supplier the purchaser can either maximize the effort the supplier performs or he must maximize his effort to obtain an optimum mix. The ultimate goal is to utilize the supplier's quality assurance program to the greatest benefit in assuring maximum quality. (ERA citation 04:051491)

CONF-791008-3 PC **A02**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
Pulsed Eddy Current Inspection System for Nondestructive Examination of Irradiated Fuel Rods.
M. E. Yancey. 1979, 8p
Contract EY-76-C-07-1570
ASNT fall conference, St Louis, MO, USA, 15 Oct 1979.

An inspection system has been developed for nondestructive examination of irradiated fuel rods utilizing pulsed eddy current techniques. The system employs an encircling type pulsed eddy current transducer capable of sensing small defects located on both the inner and outer diameter fuel rod surfaces during a single scan. Pulsed eddy current point probes are used to provide fuel rod wall thickness data and an indication of radial defect location. Two linear variable differential transformers are used to provide information on fuel rod diameter variation. A microprocessor based control system is used to automatically scan fuel rods up to 4.06 meters in length at predetermined radial locations. Defects as small as 0.005 cm deep by 0.254 cm long by 0.005 cm wide have been detected on outside diameter surfaces of a 1.43 cm outside diameter fuel rod cladding with a 0.094 cm wall thickness and 0.010 cm deep by 0.254 cm long by 0.005 cm wide on the inside diameter surface. (ERA citation 04:053160)

COO-2245-68TR PC **A22**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Nuclear Engineering.
Multicell Slug Flow Heat Transfer Analysis of Finite LMFBR Bundles.
M. K. Yeung, and L. Wolf. Dec 78, 511p

Contract EY-76-S-02-2245

An analytical two-dimensional, multi-region, multicell technique has been developed for the thermal analysis of LMFBR rod bundles. Local temperature fields of various unit cells were obtained for 7, 19, and 37-rod bundles of different geometries and power distributions. The validity of the technique has been verified by its excellent agreement with the THTB calculational result. By comparing the calculated fully-developed circumferential clad temperature distribution with those of the experimental measurements, an axial correction factor has been derived to account for the entrance effect for practical considerations. Moreover, the knowledge of the local temperature field of the rod bundle leads to the determination of the effective mixing lengths L/sub ij/ for adjacent subchannels of various geometries. It was shown that the implementation of the accurately determined L/sub ij/ into COBRA-IIIC calculations has fairly significant effects on intersubchannel mixing. In addition, a scheme has been proposed to couple the 2-D distributed and lumped parameter calculation by COBRA-IIIC such that the entrance effect can be implanted into the distributed parameter analysis. The technique has demonstrated its applicability for a 7-rod bundle and the results of calculation were compared to those of three-dimensional analyses and experimental measurements. (ERA citation 04:048621)

COO-2250-37 PC **A09**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Nuclear Engineering.
Interfacial Effects in Fast Reactors.
M. S. Saidi, and M. J. Driscoll. May 79, 196p
Contract EY-76-S-02-2250

The problem of increased resonance capture rates near zone interfaces in fast reactor media has been examined both theoretically and experimentally. An interface traversing assembly was designed, constructed and employed to measure U-238 capture rates near the blanket--reflector interface in the MIT Blanket Test Facility. Prior MIT experiments on a thorium--uranium interface in a blanket assembly were also reanalyzed. Extremely localized fertile capture rate increases of on the order of 50% were measured immediately at the interfaces relative to extrapolation of asymptotic interior traverses, and relative to state-of-the-art (LIB-IV, SPHINX, ANISN/2DB) calculations which employ infinite-medium self-shielding throughout a given zone. A method was developed to compute a spatially varying background scattering cross section per absorber nucleus which takes into account both homogeneous and heterogeneous effects on the interface flux transient. (ERA citation 04:051543)

COO-2458-22 PC **A02**/MF **A01**
Rensselaer Polytechnic Inst., Troy, NY. Dept. of Nuclear Engineering.
Simple Representations of Spectrum Averaged Cross Sections in LMFBR Blankets.
A. Badruzzaman, R. Wiley, and M. Becker. 1978, 7p CONF-781105-101
Contract EY-76-S-02-2458
ANS meeting, Washington, DC, USA, 12 Nov 1978.

The setting up of correlations to represent spectrum averaged cross sections in the core-blanket interface and blanket region of LMFBRs is described. Analytical representations of concentrations as functions of position are used. Sample calculations using a CRBR core composition are presented. (ERA citation 04:051492)

COO-4261-10 PC **A02**/MF **A01**
Wisconsin Univ.-Madison. Dept. of Nuclear Engineering.
Retention of Molten Core Debris Pools in Composite Sacrificial Beds.
I. K. Paik, and S. I. Abdel-Khalik. 5p
Contract EN-77-S-02-4261

Passive core catchers have been proposed as a means for retaining the core debris following a hypothetical core disruptive accident in a fast reactor. The core debris which may be in the form of a molten pool is passively retained in a sacrificial bed of high melting temperature material placed inside or outside the reactor vessel. Recently, it has been suggested that composite sacrificial beds with a low-melting-temperature zone inside the main high-melting-temperature bed may be more effective in retaining the pool than simple beds. It was argued that the inner zone would quickly melt and dilute the pool so that further growth into the main bed would be slowed. Hence, the main objective of this work has been to examine the composite bed concept to ascertain its efficacy vis-a-vis simple sacrificial beds. (ERA citation 04:050140)

COO-4261-11 PC **A06**/MF **A01**
Wisconsin Univ.-Madison.
Simulation of Heat and Mass Transfer Processes in Molten Core Debris-Concrete Systems.
D. K. Felde. 1979, 116p
Contract EN-77-S-02-4261
Thesis.

The heat and mass transport phenomena taking place in volumetrically-heated fluids have become of interest in recent years due to their significance in assessments of fast reactor safety and post-accident heat removal (PAHR). Following a hypothetical core disruptive accident (HCDA), the core and reactor internals may melt down. The core debis melting through the reactor vessel and guard vessel may eventually contact the concrete of the reactor cell floor. The interaction of the core debris with the concrete as well as the melting of the debris pool into the concrete will significantly affect efforts to prevent breaching of the containment and the resultant release of radioactive effluents to the environment. (ERA citation 04:051661)

COO-4261-8 PC **A02**/MF **A01**
Wisconsin Univ., Madison. Dept. of Nuclear Engineering.
Convective Heat Transfer Correlations for Molten Core Debris Pools Growing in Concrete.
D. K. Felde, H. S. Kim, and S. I. Abdel-Khalik. 5p
Contract EN-77-S-02-4261

The heat and mass transfer processes taking place in volumetrically-heated pools are of interest because of their relevance in post accident heat removal analyses for fast reactors. Earlier studies on volumetrically-heated pools have focused on natural convection phenomena. These, however, do not apply for molten core debris pools growing in concrete since large amounts of gas will be released by the concrete. These gases will vigorously mix the pool. Knowledge of the heat transfer rates at the pool boundaries is necessary in order to assess the passive core retention capability of the concrete support structure below the reactor vessel. Hence, the main objectives of this investigation have been to experimentally simulate the gas evolution process at the pool boundaries and determine the effect of gas release on the heat transfer rates along the boundaries. Nusselt-type correlations have been obtained for the downward, sideward, and upward heat transfer rates. (ERA citation 04:053253)

COO-4261-9 PC **A02**/MF **A01**
Wisconsin Univ.-Madison. Dept. of Nuclear Engineering.
Effect of Overlaying Steel Layers on the Growth of Molten Core Debris Pools in Concrete.
I. K. Paik, D. K. Felde, and S. I. Abdel-Khalik. 5p
Contract EN-77-S-02-4261

Following a hypothetical core disruptive accident (HCDA) in a fast reactor, the core debris may be in the form of a molten pool which is volumetrically heated by the radioactive decay of the dissolved fission products. The debris pool may be retained in the concrete support structure below the reactor vessel. It grows continually by melting the concrete which readily dissolves in the pool. The purpose of this research is to simulate the heat and mass transfer processes taking place in the molten steel/core debris/concrete system. The effects of the initially-lighter steel layer atop the pool and the subsequent inversion process on the transient radial and downward growth rates of the pool are investigated. (ERA citation 04:050139)

CRBRP-GEFR-SP-139 PC **A03**/MF **A01**
General Electric Co., Sunnyvale, CA. Advanced Reactor Systems Dept.
Internal Fluid Flow Management Analysis for Clinch River Breeder Reactor Plant Sodium Pumps.
S. M. Cho, H. L. Zury, M. E. Cook, and C. E. Fair. Dec 78, 27p CONF-781202-41
Contract EY-76-C-03-0893-001
ASME meeting, San Francisco, CA, USA, 10 Dec 1978.

The Clinch River Breeder Reactor Plant (CRBRP) sodium pumps are currently being designed and the prototype unit is being fabricated. In the design of these large-scale pumps for elevated temperature Liquid Metal Fast Breeder Reactor (LMFBR) service, one major design consideration is the response of the critical parts to severe thermal transients. A detailed internal fluid flow distribution analysis has been performed using a computer code HAFMAT, which solves a network of fluid flow paths. The results of the analytical approach are then compared to the test data obtained on a half-scale pump model which was tested in water. The details are presented of pump internal hydraulic analysis, and test and evaluation of the half-scale model test results. (ERA citation 04:051493)

DNS-D-1-019 PC **A09**/MF **A01**
Dow Chemical Co., Midland, MI.
Chemical Cleaning of the Corrosion Fatigue Loop at Dresden-1. Volume 1, Sections 1–6.
26 Aug 78, 190p
Contract EY-76-C-02-4014

Dresden Unit-1 (Dresden-1) of the Commonwealth Edison Company (CECo) has been in operation since 1960. During these years of service, radiation levels throughout the unit have continuously risen. It was realized that this radiation was rapidly approaching undesirable magnitudes. CECo requested that prior to attempting to chemically clean the entire primary system of Dresden-1, a test under actual field conditions be completed. This test would: (1) verify the effectiveness of NS-1 solvent, (2) evaluate the corrosion rates of the metals in the system, (3) observe the return of the system to service, and (4) acquaint non-CECo personnel with CECo's required procedures. Valid representation of the existing conditions at Dresden-1 became the major criterion for the selection of a representative system to chemically clean as a test. The choice was to chemically clean the General Electric Task K Corrosion Fatigue Test Loop (the Loop) on the B steam generator of Dresden-1. The Loop was selected for use in the field test because it had been exposed to actual Dresden-1 conditions, and contained deposits similar to those expected to be present in the primary side of the reactor. The decision was made to use an existing Dow Skid containing the equipment necessary to circulate solvent in the Loop. In order to extend the results of the pilot study to other reactors, a Spool Piece was fabricated and installed in the Loop. It would contain sections of 4" diameter stainless steel pipe from the Dresden Units 2 and 3, Quad Cities-2, and Monticello. A mock-up of a Reactor Vessel Safe End was installed as part of the Spool Piece. The cleaning of the Loop and test pices is described. (ERA citation 04:049868)

DOE-tr-180 PC **A05**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Reaktorentwicklung.
DERAN: Computer Program for Identification of Radioactive Nuclides in Measured gamma Spectra.
S. Jacobi, K. Letz, and G. Schmitz. 5 Jul 78, 97p
C KFK--2447, April 1977.

The computer program DERAN (Detection of Radioactive Nuclides) was developed to evaluate gamma spectra measured by Ge(Li) detector systems at the HSD loop of the FR2. This program is written in Fortran IV and divided into several blocks: establishment of a relationship between channel number and gamma energy of the corresponding photo peak; detection of photo peak; determination of the position and the count for the photo peak; identification of gamma-emitting nuclides; and calculation of corresponding activities. The first three blocks are run through in each calculation; the last two are optional. The spectra are fed into the computer on perforated tapes or magnetic tapes; a printer is used to output the results. Evaluation of a spectrum requires a maximum core storage of 240 exp 0 K and a maximum computation time of 30 sec. (ERA citation 04:050030)

EGG/SEMI-TR-010 PC **A05**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
Simulation of the Three Mile Island Transient in Semiscale.
T. K. Larson, G. G. Loomis, and R. W. Shumway. Jul 79, 94p
Contract EY-76-C-07-1570

This report presents the results of a preliminary review and analysis of the data obtained from eight simulations of the Three Mile Island Unit 2 Nuclear Power Generating Station transient (March 28, 1979) that have been conducted in the Semiscale Mod-3 System. The Semiscale simulations of the Three Mile Island (TMI) transient were basically conducted from the same sequence of events as those recorded in the plant. System initial conditions representative of those in the TMI system were established and the transient was initiated by terminating steam generator feedwater and steam valve flow. The steam generator secondaries were drained to control primary to secondary heat transfer. The pressurizer power operated relief valve, pressurizer code safety valve, and core power trip were operated on system pressure. High pressure safety injection was activated for about one minute during the Semiscale simulations. In addition, both primary loop coolant pumps were shut off in the Semiscale simulation at the same time that the Three Mile Island loop 2A pump was shut off. (ERA citation 04:053240)

EPRI-NP-1014(V.10) PC **A15**/MF **A01**
Bechtel, Inc., San Francisco, CA.
Pool-Type LMFBR Plant 1000 MWe Phase A-Extension-2 Design. Part XII: Appendices. Final Report.
Jun 79, 331p

Information presented includes system listing; an equipment list; piping class sheets; and a list of drawings. (ERA citation 04:048631)

EPRI-NP-1014(V.4) PC **A21**/MF **A01**
General Electric Co., Sunnyvale, CA. Advanced Reactor Systems Dept.
Pool-Type LMFBR Plant 1000 MWe Phase A-Extension-2 Design. Part III: Reactor Assembly, Sec. 2-6--Appendix IIIB. Final Report.
Jun 79, 484p

The response to thermal striping and shock was determined for the upper internals structure. The components analyzed are identified and include (1) PRACS, (2) Fuel Transfer Tube, (3) Cold Trap, (4) Reactor Thermal Barrier, (5) Pump Thermal Barrier, (6) Horizontal Thermal Barrier, (7) IHX Upper Flow Shroud, (8) IHX Flow Shroud Inlet Region, (9) IHX External Cylinder, (10) Pump Inlet Nozzle, (11) Pump Exhaust Pipe, (12) Vessel Bottom Head, (13) Lower Core Support Structure, (14) Redundant Core Support, (15) Thermal Barrier Exits, and (16) Neutron Monitor Guide Tube. (ERA citation 04:048625)

EPRI-NP-1014(V.5) PC **A15**/MF **A01**
General Electric Co., Sunnyvale, CA. Advanced Reactor Systems Dept.
Pool-Type LMFBR Plant 1000 MWe Phase A-Extension-2 Design. Part IV: Reactor Deck. Final Report.
Jun 79, 349p

The reactor roof or deck is a dominating structure in the pool reactor configuration; in addition to closing off the top of the reactor and providing access to the core for refueling (as it does also in the loop configuration) it also encloses and supports the entire primary coolant system including all major components such as pumps, IHXs, cold traps and instrumentation. Because of the absence of a suitable existing design basis in the United States for a large pool-concept design, the objective of the design effort was to establish feasibility through an intensive review of the many possible structural, insulation, cooling and shielding arrangements. The design effort considered construction, in-service inspection, response to non-routine conditions and influence on the pump and IHX configurations. (ERA citation 04:048626)

EPRI-NP-1014(V.6) PC **A22**/MF **A01**
General Electric Co., Sunnyvale, CA. Advanced Reactor Systems Dept.
Pool-Type LMFBR Plant 1000 MWe Phase A-Extension-2 Design. Part V: Heat Transport Systems. Final Report.
Jun 79, 524p

The heat transport systems carry heat from the reactor to the IHXs and from the IHXs to the steam generators. The major components in the primary heat transport system are the primary sodium pumps and IHXs, and the major components in the intermediate heat transport system are the intermediate sodium pumps and steam generators. The history and evolution of the pool reactor heat transport systems and components during previous study phases are summarized. In addition, highlights of the current study are summaried. (ERA citation 04:048627)

EPRI-NP-1014(V.7) PC **A16**/MF **A01**
General Electric Co., Sunnyvale, CA. Advanced Reactor Systems Dept.
Pool-Type LMFBR Plant 1000 MWe Phase A-Extension-2 Design. Part VI: Auxiliary Systems; Part VII: Plant Control and Instrumentation; Part VIII: Seismic Analysis. Final Report.
Jun 79, 364p

Several key NSSS auxiliary systems are needed to support the reactor and main heat transport systems. These auxiliary systems include fuel handling and storage, reactor auxiliary cooling, sodium purification, and cover gas processing and control. Work has been performed on each of these systems, either to develop appropriate system conceptual designs or to investigate problem areas and identify solutions. For the fuel handling and storage system, the reactor auxiliary cooling system (RACS), and the primary sodium purification system overall system designs have been generated. Conceptual and/or preliminary designs of major components have been generated. For the cover gas system, two key aspects have been studied. The cover gas pressure control performance requirements have been defined and a suitable control system identified. In addition gas leakage through the component-to-deck seals has been analyzed. Recommended seal types and configurations have been established. (ERA citation 04:048628)

EPRI-NP-1014(V.8) PC **A15**/MF **A01**
General Electric Co., Sunnyvale, CA. Advanced Reactor Systems Dept.
Pool-Type LMFBR Plant 1000 MWe Phase A-Extension-2 Design. Part IX: Constructability and Fabricability; Part X: Maintainability and Inspectability; Part XI: Safety. Final Report.
Jun 79, 330p

Information is presented concerning the construction and fabrication of the upper internals structure and thermal barriers, maintainability and inspectability of reactor components, and design basis accidents. (ERA citation 04:048629)

EPRI-NP-1073 PC **A08**/MF **A01**
Science Applications, Inc., La Jolla, CA.
Generalization of the ARMP Depletion Capability: Interfacing of the Stand Alone EPRI-CINDER with EPRI-CELL. Final Report.
M. G. Stamatelatos, and M. A. Chipman. Jun 79, 152p

An automated interface between EPRI-CELL, a reactor cell analysis code, and EPRI-CINDER, a point depletion and fission-product code, has been generated for use in the Advanced Recycle Methodology Program (ARMP) system. This enables an efficient sequential operation of the two codes without direct handling of intermediate CELL output that is used to modify the CINDER input at each depletion time step. This alternative to the existing CELL internal depletion capability provides means for new and better application of these codes to wider areas of nuclear problems. The stand-alone EPRI-CINDER code has also been provided with new capabilities and has been modified to accept a simpler optional input structure. (ERA citation 04:049869)

ETEC-TDR-78-19(Sup.) PC **A03**/MF **A01**
Energy Technology Engineering Center, Canoga Park, CA.
Study of Safety Relief Valve Operation under ATWS Conditions.
E. S. Hutmacher, and S. D. Whitten. 25 Jul 79, 35p
Contract EY-76-C-03-0700

In March 1979, ETEC published as ETEC-TDR-78-19 a search which updated earlier NRC studies of saturated or subcooled water flow through relief valves, under ATWS conditions. This Supplement expands upon that search to include supercritical steam-water flow. No applicable data for the supercritical conditions was found, nor were any newer data on saturated or subcooled conditions uncovered. The Supplement also updated a look for facilities currently capable of simultaneously imposing all ATWS conditions upon test relief valves. Results confirmed the negative findings of ETEC-TDR-78.19. (ERA citation 04:054891)

EUR-5854 PC **A04**/MF **A01**
Commission of the European Communities, Luxembourg.
Sodium-Fuel Interaction: Dropping Experiments and Subassembly Test.
H. Holtbecker, H. Schins, E. Jorzik, and K. Klein. 1978, 58p
U.S. Sales Only.

Nine dropping tests, which bring together 2 to 4 kg of molten UO sub 2 with 150 l sodium, showed the incoherency and non-violence of these thermal interactions. The pressures can be described by sodium incipient boiling and bubble collapse; the UO sub 2 fragmentation by thermal stress and bubble collapse impact forces. The mildness of the interaction is principally due to the slowness and incoherency of UO sub 2 fragmentation. This means that parametric models which assume instantaneous mixing and fragmentation are of no use for the interpretation of dropping experiments. One parametric model, the Caldarola Fuel Coolant Interaction Variable Mass model, is being coupled to the two dimensional time dependent hydrodynamic REXCO-H code. In a first step the coupling is applicated to a monodimensional geometry. A subassembly test is proposed to validate the model. In this test rapid mixing between UO sub 2 and sodium has to be obtained. Dispersed molten UO sub 2 fuel is obtained by flashing injected sodium drops inside a UO sub 2 melt. This flashing is theoretically explained and modelled as a superheat limited explosion. The measured sodium drop dwell times of two experiments are compared to results obtained from the mentioned theory, which is the basis of the Press 2 Code. (Atomindex citation 10:452790)

FEI-739 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Obninsk. Fiziko-Energeticheskii Inst.
Ways of Solving Some Engineering Problems in Arrangement of Integral and Loop Type Fast Reactors.
A. A. Rineiskii, R. P. Baklushin, V. N. Ivanenko, S. A. Klimov, and N. P. Mel'nikov. 1977, 21p
In Russian.
U.S. Sales Only.

A comparative analysis of currently-in-use and feasible arrangements of loop and integral LMFBR type reactors is given. The discussion is based on the designs of "in operation", "under construction" and "projected" reactors all over the world. The effects of the outlet coolant temperature, reactor unit power, maintainability and costs on the choice of the arrangement type are considered. Considered in greater details are the hydraulic schemes and problems of the integral reactor vessel attachment as well as problems of ensuring strength of pipe-to-vessel connections and localizing coolant leaks in the loop type reactors. There is no general consent over the superiority of one of the designs up to now. There are different opinions on the account in different countries, since both designs have its merits and shortcomings. (Atomindex citation 10:449694)

FEI-781 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Obninsk. Fiziko-Energeticheskii Inst.

Experimental Study on Temperature Fields at the Inlet Section of Rod Bundles Flow-Arrounded by Turbulent Flow of Liquid Metal Coolent. In Simultaneous Hydrodynamic and Thermal Stabilization.
A. V. Zhukov, N. M. Matyukhin, N. A. Kotovskii, and E. Ya. Sviridenko. 1977, 15p
In Russian.
U.S. Sales Only.

The experimental study on temperature fields is carried out at the inlet thermal section of rod bundles flow-arrounded by a turbulent flow of a liquid metal coolant (a sodium-potassium alloy) in simultaneous hydrodynamic and thermal stabilization. The heat transfer along the height of the rods was constant. The relative rod pitch ($1.0 < s/d < 1.42$), the parameter of the equivalent rod thermal conductivity ($0.4 < epsilon < 15$) and the Peckle (Reynolds) number where changed. The empirical relations for calculating the lengths of the inlet thermal sections according to the coefficients of heat transfer and the temperature non-uniformity are obtained. Experimentally shown is the possibility of using the Duamel integral for hydrodynamically nonstabilized flow at the inlet section of rod lattices in case of cosinusoidal heat extraction characteristic for fast reactors. The factual material is obtained according to the coefficients of heat transfer and the temperature non-uniformity at the inlet thermal section of the rod bundles for the direct utilization in calculating for the alternating energy extraction according to the Duamel relation. (Atomindex citation 10:449222)

FEI-800 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Obninsk. Fiziko-Energeticheskii Inst.
Experimental Study on Temperature Fields and Heat Transfer in Triangular Lattices of Liquid Metal Cooling Fuel Element Simulators.
A. V. Zhukov, E. Ya. Sviridenko, and N. M. Matyukhin. 1978, 15p
In Russian.
U.S. Sales Only.

The results are given to systematic investigations into the temperature fields and heat exchange of cylindrical simulators of fuel elements (liquid-metal cooling) in the most important reactor construction area of relative pitches of fuel elements lattice ($1 < delta/d < 1.4$) with wide-range variation of the Pecle numbers ($4 < Pe < 3500$), Prandl numbers ($0.007 <= Pr <= 0.03$), and the parameter of the equivalent thermal conductivity of fuel element simulators ($0.2 <= E <= 16$). Information on the experimental technique and its accuracy is supplied. The investigation results are systematized in the form of generalized equations for nonuniformities in the temperatures and Nusselt numbers. Tables of experimental data are presented. (Atomindex citation 10:452520)

FEI-811 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Obninsk. Fiziko-Energeticheskii Inst.
Estimation of Possibility of Increasing Breeding Ratio for a NPP with Fast Reactors in a Variable Load Regime.
V. G. Ilyunin, V. M. Murogov, and A. N. Shmelev. 1978, 20p
In Russian.
U.S. Sales Only.

The relationships which make it possible to estimate the efficiency of operation of fast nuclear reactors in the regime of variable complex (thermal and electrical) loads within the framework of NPP with several nuclear reactors in a unified thermodynamic cycle are obtained. The use of the indicated relationships is illustrated for a NPP with a power output of 1500 Mw-el. (3750 Mw-therm.) with two nuclear reactors (a "low-temperature", with a power output of 3000 Mw on a metal fuel, and a"high-temperature" one with a power output of 750 Mw on an oxide fuel). It is shown that, for instance, on decrease of the electrical load to approximately 70% nominal, the rate of production of new nuclear fuel within the framework of the indicated NPP can be incread by approximately 25%. (Atomindex citation 10:452791)

FEI-818 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Obninsk. Fiziko-Energeticheskii Inst.
Effect of Relative Pitch, Form of Packing and Direction of Vibrations on Inertial and Damping Characteristics of Single Cylinders and Rod Bundles in Liquid.
V. F. Sinyavskii, V. S. Fedotovskii, A. B. Kukhtin, and V. S. Spirov. 1978, 12p
In Russian.
U.S. Sales Only.

Small oscillations of a circular cylinder surrounded by flat hard walls, and of a bundle of cylindrical rods in a low-viscosity liquid are considered. Apparent masses for a cylinder oscillating near a flat wall, in a flat slit and for sinphase oscillations of rods bundle are found with the aid of the method of electrohydrodynamic analogy. The coefficients of hydrodynamic damping of oscillations are found in the thin-boundary-layer approximation. It is shown that in uncramped rods bundles the apparent mass and the coefficient of hydrodynamic damping of oscillations can be calculated approximately from the model of equivalent annular cells. Equations approximating the calculated data of the authors are proposed for cramped rods bundles. (Atomindex citation 10:452517)

FEI-819 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Obninsk. Fiziko-Energeticheskii Inst.
Analysis of Proportionality Constant Between Electromagnetic Detector Signal and Longitudinal Coolant Velocity in Fuel Element Lattices. Laminar and Turbulent Flow.
V. I. Mikhin, and A. V. Zhukov. 1978, 14p
In Russian.
U.S. Sales Only.

A theoretical analysis of the factor of proportionality between velocity and signal of an electromagnetic detector for the laminar and turbulent velocity profiles in triangular rod lattices is carried out. The limits of applicability of the hypothesis on the constancy of the proportionality factor are revealed, and information on the effect of certain conditions on the proportionality factor is given. The results of detailed calculations related to the problem in hand are presented. In the general case, the factor of proportionality between velocity and signal depends on the angle of orientation of the detector, the pitch of the rods lattice and the flow regime. These dependences may be of an opposite nature. This enbales one to select a detector with such a magnet that the proportionality factor will be constant for a wide range of rods lattice pitches. (Atomindex citation 10:452513)

GA-A-15313 PC **A02**/MF **A01**
General Atomic Co., San Diego, CA.
GCFR Safety Program in the US Overview and Status.
A. Torri, A. P. Kelley, and E. E. Emon. May 79, 21p CONF-790384-1
Contract EY-76-C-03-0167-023
GCFR safety specialist meeting (NEA/IAEA), Brussels, Belgium, 13 Mar 1979.

The GCFR Safety Program in the US has evolved over the past 10 years. Since 1968 utilities have supported the analysis of operational safety characteristics within the design basis envelope. Since 1974 DOE has supported probabilistic safety technology work and an assessment of postulated events beyond the design bases. In 1978 a first issue of a GCFR Safety Program Plan was completed with the dual objectives of assuring that the DOE sponsored program addresses all important safety considerations related to public safety with the appropriate priority, and of serving as a tool for the integration of the GCFR safety programs carried out at General Atomic, Argonne National Laboratory, Los Alamos Scientific Laboratory and at EG and G Idaho. The plan defines 5 task areas - Definition Studies, Probabilistic Technology, Core Accident Technology, Primary Vessel Containment Technology and Secondary Containment Technology. For each task specific objectives are defined and a set of task elements are identified through which the task objectives will be accomplished. (ERA citation 04:051664)

GA-A-15402 PC **A06**/MF **A01**
General Atomic Co., San Diego, CA.
Methodology for Risk Assessment of Major Fires and Its Application to an HTGR Plant.
K. N. Fleming, W. J. Houghton, and F. P. Scaletta. Jul 79, 107p
Contract AT03-76ET35300

A risk assessment methodology is presented for a specific class of reactor accidents, major fires. Principal elements of the methodology include collection and interpretation of experience data, identification and screening of important fire locations, event tree/fault tree analysis, and accident consequence assessment. About 900 reactor-years experience was examined for reported fires either during construction or plant operation. Statistical analyses were performed of fire initiation and progression characteristics such as occurrence rate, distance of fire spread, and time to bring fire under control. (ERA citation 04:054892)

GA-A-15448 PC **A05**/MF **A01**
General Atomic Co., San Diego, CA.
Cooling Tubes: Monotonic and Cyclic Shear Tests. Final Report.
J. L. Pikckering. Jul 79, 97p
Contract EY-76-C-03-0167-017

In the prestressed concrete reactor vessel (PCRV), cooling tubes are welded on the concrete side of the cavity liners. These cooling tubes are placed at pitches determined by the design temperature limits of the liner/concrete interface and are subject to shear loading resulting from prestressing, pressurization, temperature, and creep of the PCRV. This test program consists of both monotonic and cyclic testing of models simulating prototype cooling tube/concrete assemblies. The Phase III tests determined the stiffness characteristics and failure modes of four possible cooling tube configurations having round and square cross sections. A comparison with the previously obtained results of the Phase I and Phase II tests on 1-in. x 1-in. square tubes is also included. (ERA citation 04:054672)

GA-A-15455 PC **A08**/MF **A01**
General Atomic Co., San Diego, CA.
GCFR Upflow/Downflow Study Summary Report.
H. F. Menzel. Aug 79, 154p
Contract EY-76-C-03-0167-061

During the one-year study a conceptual upflow core plant design was developed and the downflow core plant reference design updated. A comparison was made between the two plant designs in critical areas of plant performance, safety, and licensing. The results of that comparison led to the recommendation to adopt an upflow core for the GCFR plant reference design. Although additional development and design efforts are required, the potential of residual heat removal by natural circulation alone offers a decisive safety and licensing advantage. (ERA citation 04:053184)

GA-A-15461 PC **A02**/MF **A01**
General Atomic Co., San Diego, CA.
Core Meltdown Assessment in the GCFR.
A. Torri, M. Frank, and C. Kang. May 79, 21p
Contract EY-76-C-03-0167-023

This paper discusses the chronological sequence of events and supporting analysis during a total loss of all coolant circulation in the GCFR with top supported core. Redundant and diverse cooling systems provided for decay heat removal reduce the probability of this postulated event below the range of plant design bases. It is nevertheless considered to investigate the potential for consequence mitigation and containment margin. Two distinct phases of the sequence are discussed: 1) the core response to a total loss of coolant circulation and 2) the capability of the PCRV to retain molten fuel debris. GCFR specific design features to prevent recriticality and fuel vaporization due to fuel slumping are under investigation. Analytical and experimental work is in progress to evaluate the feasibility of such early accident termination mechanisms. Several concepts for post accident fuel containment have been identified and appear technically feasible. (ERA citation 04:051665)

GA-A-15463 PC **A02**/MF **A01**
General Atomic Co., San Diego, CA.

Role of Probabilistic Analysis in the GCFR Safety Program.
A. P. Kelley, A. Torri, and D. E. Emon. May 79, 16p CONF-790384-2
Contract EY-76-C-03-0167-023
GCFR safety specialist meeting (NEA/IAEA), Brussels, Belgium, 13 Mar 1979.

Since early 1974, a program of probabilistic safety studies of the GCFR has been underway in the US, principally under Department of Energy sponsorship. Results from this program to date have been reported in five major topical reports and several conference papers. The program during this period has evolved into four principal activities which form a hierarchy of work flow in that the results from one activity provide the basis for establishing the area of emphasis in succeeding activities. This paper summarizes the approach and major conclusions which have been reached in each of the four probabilistic safety study areas. In addition, the paper identifies how the conclusions of this work have affected safety research activities and the design of the GCFR, as well as how the work is expected to be factored into the US GCFR engineering effort in the future. (ERA citation 04:051666)

GA-A-15507 PC **A03**/MF **A01**
General Atomic Co., San Diego, CA.
Seismic Design of GCFR Core Support System.
A. S. Chuang, and H. Jones. Jul 79, 28p
Contract EY-76-C-03-0167-023

For an unrestrained GCFR core, such as the reference downflow core, the criterion for determining the thickness of the grid plate is the limitation of 10 cents reactivity change due to the transient pressure history during the loss of coolant accident. In the case of a restrained core, there will be little reactivity change caused by the limited radial motion of the core elements. As a result the initial grid plate deflection-limited core support will not be governed by the vertical seismic response of the core/core support system. It is proposed that for conceptual sizing studies a conservative thickness for the grid plate be determined. The fundamental vertical frequency of the system will be made at least 1-1/2 times higher than the fundamental vertical frequency of the PCRV for the appropriate site and soil conditions. When the in-structure design response spectra for the core support structure are available the actual dynamic response of the system will be investigated and an optimum thickness calculated. (ERA citation 04:054893)

GA-A-15512 PC **A02**/MF **A01**
General Atomic Co., San Diego, CA.
GCFR Main Helium Circulator and Electric Drive.
D. D. Kapich, and C. O. Sterrett. Jul 79, 22p CONF-790572-5
Contract EY-76-C-03-0167-023
Helium Breeder Associates/US Dept of Energy GCFR technical meeting, San Diego, CA, USA, 30 May 1979.

One of the major objectives of the helium circulators for the gas-cooled fast breeder reactor (GCFR) is to achieve the highest possible operational reliability. This is no simple task considering the plant system integration requirements, auxiliary support systems, all possible transient requirements, and resulting complexity in supplying the driving power, primary coolant flow control, and lubrication and sealing. Therefore, the design of the circulator itself is highly dependent on the type of prime mover selected to drive the circulator, e.g., series turbine, parallel turbine, or electric motor. The circulator main drive has evolved from the series steam turbine drive into the variable-speed, synchronous electric motor drive mounted externally to the reactor and controlled by thyristor variable frequency controller. This design is a result of 18 months of joint effort by General Atomic Company and Westinghouse Electric Corporation. (ERA citation 04:053185)

GA-A-15514 PC **A03**/MF **A01**
General Atomic Co., San Diego, CA.
Steam Ingress Reactivity Effects in the GCFR.
A. L. Hess, and C. J. Hamilton. Jul 79, 29p
Contract EY-76-C-03-0167-023

Because of the higher pressure on the steam side of the steam generator in the gas-cooled fast breeder reactor (GCFR), the potential exists for steam-generator tube leaks or ruptures which might introduce water vapor into the primary coolant and thence into the core region. This potential for core steam ingress requires that a satisfactory understanding of the reactivity effects due to various concentrations of hydrogeneous material in the core be achieved. The reactivity effects resulting from an increase in hydrogen density are twofold: a decrease in neutron leakage from the core, and a moderation of the neutron energy spectrum. The leakage effect is always positive and is predominant in smaller systems with attendant higher leakage fractions. Also, the cold-to-hot operating core temperature transition produces a negative reactivity effect (to a large extent due to the Doppler effect on absorption in U-238), which is substantially increased by progressive softening of the spectrum due to hydrogen addition. Research programs studying these reactivity effects are described. (ERA citation 04:054700)

GEFR-SP-027 PC **A02**/MF **A01**
General Electric Co., Sunnyvale, CA. Fast Breeder Reactor Dept.
Risk Allocation Approach to Reactor Safety Design and Evaluation.
O. Gokcek, M. I. Temme, and S. L. Derby. 23 Aug 77, 7p CONF-780507-20
Contract EY-76-C-03-0893-019
Probabilistic analysis of nuclear reactor safety, Los Angeles, CA, USA, 8 May 1978.

The techniques of probabilistic risk assessment and risk allocation are viable and valuable tools for establishing safety reliability goals for nuclear power plants. These methods allow quantitative design goals to be derived from a risk acceptance constraint. The basic concept described in this paper can be applied to other type power generating plants with minor modifications. (ERA citation 04:051669)

GKSS-78/E/36 PC **A03**/MF **A01**
Gesellschaft fuer Kernenergieverwertung in Schiffbau und Schiffahrt m.b.H., Geesthacht-Tesperhude (Germany, F.R.). Inst. fuer Anlagentechnik.
Analytical Simulation of the Containment Performance During LOCA.
H. Schwan. 1978, 33p
In German.
U.S. Sales Only.

The paper gives a survey of the formulations for an analytical description of the containment performance during LOCA and indicates the essential parameters of influence. The analytically relevant heat transfer conditions and air transport mechnisms within the containment are treated in more detail. The heat transfer relations established are part of the containment code CORAN developed at GKSS. Their influence on the analytical results is demonstrated by the example of the Batelle experiment D1. (Atomindex citation 10:448907)

GRS-F-67 PC **A04**/MF **A01**
Gesellschaft fuer Reaktorsicherheit m.b.H. (GRS), Cologne (Germany, F.R.).
List of Reports from Reactor Safety Research of BMFT, USNRC, EPRI and JSTA. Period under Report: 1ST July to 30TH September 1978.
Dec 78, 72p
In German.
U.S. Sales Only.

This list reviews reports from the Federal Republic of Germany, from the USA and from Japan concerning special problems in the field of Reactor Safety Research. According to the cooperation of the Bundesminister fuer Forschung und Technologie (BMFT) with the USNRC, the Electric Power Research Institute (EPRI), and the Japan Science and Technology Agency (JSTA) these reports are available in the Gesellschaft fuer Reaktorsicherheit. The list pursues the following order: Country of origin, problem area concerned, according to the Reactor Safety Research Program of BMFT, reporting organisation. The list of reports appears quarterly. Requests for reports should be addressed to GRS, Forschungsbetreuung. Contractual view points have to be considered for the distribution of the reports. (Atomindex citation 10:452280)

GRS-F-70 PC **A09**/MF **A01**
Gesellschaft fuer Reaktorsicherheit m.b.H. (GRS), Cologne (Germany, F.R.).
Report on the Projects in the Field of Reactor Safety Sponsored by the Federal Ministry for Research and Technology. Period under Report: 1ST July to 30TH September 1978.
Dec 78, 183p
In German.
U.S. Sales Only.

Investigations on the safety of Light Water Reactors (LWR) being performed in the framework of the Research Program Reactor Safety (RS - Projects) are sponsored by the BMFT (Federal Minister for Research and Technology). Bundesminister fuer Forschung und Technologie. Objective of this program is to investigate in greater detail the safety margins of nuclear power-plants and their systems and the further development of safety technology. Besides the investigations of LWR tasks first projects on the safety of advanced reactors are sponsored by the BMFT. The GRS (Reactor Safety Association), Gesellschaft fuer Reaktorsicherheit mbH, by order of the BMFT, informs continuously of the status of such investigations by means of quarterly and annually publication of progress reports within the series GRS - F - Fortschrittsberichte (GRS - F - Progress Reports). Each progress report represents a compilation of individual reports about objectives, the work performed, the results, the next steps of the work etc. The individual reports are prepared in a standard form by the contractors themselves as a documentation of their progress in work and published by the FB (Research Coordination Department). Forschungsbetreuung at the GRS, within the framework of general information of the progress in reactor safety research. The individual reports are arranged according to the amended LWR Safety Research Program of the BMFT which will appear in the near future. Another table contents uses the same classification system as applied in the Nuclear Safety Index of the CEC and the OECD. (Atomindex citation 10:452279)

HEDL-SA-1552-S PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Fission Gas Behavior in Mixed-Oxide Fuel During Transient Overpower and Simulated Loss-of-Flow Tests.
E. H. Randklev, and C. A. Hinman. 1979, 12p CONF-790306-23
Contract EY-76-C-14-2170
International conference on fast breeder reactor performance, Monterey, CA, USA, 5 Mar 1979.

A portion of the fission gases (Xe, Kr) generated during steady state irradiation of an FBR mixed-oxide fuel is retained within its microstructure, especially in the cooler regions of the fuel. Information on the behavior of these retained gases relative to their microstructural relocation and release during off-normal power and coolant flow conditions is important to the analysis and analytic modeling of fuel-pin transient and reactor core performance. This paper discusses the steady state and transient behavior of retained fission gas relative to the geometry, microstructure, temperature, and apparent release mechanisms within selected axial and radial regions of fuel pins irradiated at medium power (7 to 10 kW/ft) and burnup (30 to 60 MWd/kgm). The specific fuel pins are from the PNL-10 and PNL-2 subassemblies irradiated in EBR-II. The transient overpower tests involved integral fuel pin static capsule experiments performed in TREAT. Loss-of-coolant flow was simulated in an out-of-reactor thermal transient testing system using axial segments of irradiated fuel pins. (ERA citation 04:050046)

HEDL-SA-1588 PC **A03**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Initial Acceptance Test Experience with FFTF Plant Equipment.
R. K. Brown, K. A. Coleman, M. K. Mahaffey, C. G. McCargar, and M. W. Young. Sep 78, 35p CONF-7809110-3
Contract EY-76-C-14-2170
Plant experience working group meeting, Ibaraki-Ken, Japan, Sep 1978.

The purpose of this paper is to examine the initial acceptance test experience of certain pieces of

auxiliary equipment of the Fast Flux Test Facility (FFTF). The scope focuses on the DHX blowers and drive train, inert gas blowers, H and V containment isolation valves, and the Surveillance and In-service Inspection (SISI) transporter and trolley. For each type of equipment, the discussion includes a summary of the design and system function, installation history, preoperational acceptance testing procedures and results, and unusual events and resolutions. (ERA citation 04:051640)

HEDL-SA-1640 PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Load Rating and Design Criteria for Pipe Snubbers with Extension Struts.
R. D. Entz, and M. J. Anderson. Feb 79, 7p CONF-790615-25
Contract EY-76-C-14-2170
US national congress on pressure vessels and piping, San Francisco, CA, USA, 25 Jun 1979.

Snubbing devices are used extensively in nuclear power plant piping to prevent seismic shock forces from causing damaging pipe motions. Most seismic snubbers are designed and load rated by the manufacturer without consideration of attaching structure, unless specifically requested to do so by the purchaser. This paper discusses the additional design constraints imposed by the use of extension struts with the seismic snubbers. The constraints evaluated include load rating reduction as a function of strut length, and strut length limitations to pevent dynamic instability. (ERA citation 04:051671)

HEDL-SA-1641 PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Inelastic Analysis of Two Pipelines in the Fast Flux Test Facility.
S. N. Huang. Jan 79, 18p CONF-790615-24
Contract EY-76-C-14-2170
US national congress on pressure vessels and piping, San Francisco, CA, USA, 25 Jun 1979.

Several complex pipelines of the Fast Flux Test Facility (FFTF) were evaluated using detailed inelastic analysis because they did not satisfactorily comply with the ASME elastic analysis rules. The purpose of the inelastic analysis is to demonstrate that the piping systems, which operate at elevated temperatures, comly with ASME Code requirements under the loading conditions specified in the Design Specification of each pipeline, using inelastic analysis rules. Two pipelines are discussed, the 8-inch Secondary Hot Leg in the Heat Transport System and the 3-inch/4-inch Primary Hot Leg (Ex-module) in the Closed Loop System. The former is made from type 304SS, operating at 965 exp 0 F (518.3 exp 0 C) and designed for a 20 year life; the latter is made from type 316SS, operating at 1200 exp 0 F (648.9 exp 0 C) and designed for a 10 year life. The MARC general finite element computer program was utilized in the analyses. The pipelines were idealized using the combinations of thin-walled circular closed section beam elements and constant bending 3-node elbow elements. Discussions on the load histograms used, the inelastic strain accumulated, and the effects of creep and fatigue on the lines are given. (ERA citation 04:053218)

HEDL-SA-1669 PC **A04**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Summary of HEDL Sodium Fire Tests.
R. K. Hillard. Oct 78, 69p CONF-7811137-1
Contract EY-76-C-14-2170
IAEA/IWGFR specialists meeting, Cadarache, France, 20 Nov 1978.

The sodium fire test program and related studies at the Hanford Engineering Development Laboratory (HEDL) are described. The program is analytical and experimental in scope, with computer code development and experimental verification. Tests have ranged in size from gram quantity laboratory tests to 1600-kg sodium spills. The experimental work is performed in two facilities: the Large Sodium Fire Facility (LSFF) and the Containment Systems Test Facility (CSTF). Sodium fire extinguishment tests which verified the Fast Flux Test Facility (FFTF) secondary sodium fire protection system are described and related informaion on sodium burning rates and smoke release rates are correlated. The burning rates are compared to theoretical predictions based on heat and mass transfer analogy, with good agreement. Comparisons with the SOFIRE-II code are also made. Sodium combustion aerosol properties are defined as to chemical and physical nature, settling in closed vessels and effect of added water vapor. The HAA-3B aerosol behavior computer code is compared to tests in the 850-m exp 3 CSTF containment vessel. Sodium spray tests in the CSTF are compared with the SPRAY computer code. An air cleaning prcgram is described, which has the objective of removing high mass concentration sodium combustion aerosols from vented cells and containment buildings. The aerosol mass holding capacity of commercial filters was measured and an aqueous scrubber system is described. The effects of sodium spills on cell structures were investigated, including water release from heated concrete, the reaction of sodium with concrete, the formation and spontaneous recombination of hydrogen, and the ability of steel cell liners to withstand large spills of high temperature sodium without leaking. (ERA citation 04:051672)

HEDL-SA-1679 PC **A03**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
FFTF Implementation of Training Requirments for Government Owned Facilities.
A. D. Gadeken, R. D. Izatt, and J. C. Wiborg. 1978, 26p CONF-7804149-1
Contract EY-76-C-14-2170
3 symposium on the training of nuclear facility personnel, Gatlinburg, TN, USA, 29 Apr 1978.

The Fst Flux Facility (FFTF) is a liquid metal cooled, fast flux reactor plant. It is owned by the Department of Energy (DOE) and is operated by the Hanford Engineering Development Laboratory (HEDL) under a DOE contract with Westinghouse Hanford Company. The FFTF is presently undergoing acceptance testing of sodium systems in preparation for initial criticality in August 1979. It will be used to test fuels and materials, to develop associated components and to gain operating experience for future LMFBR's. The FFTF Training Program is a specific example of how training guidelines provided by NRC can be implemented in principle in a DOE owned reactor. The DOE requirements for government owned facilities and the NRC requirements for commercially owned facilities are compared to components of the FFTF Training program. These components will be described, actual status provided and evaluated as to meeting requirements. Cold Plant Qualification (equivalent to NRC Col Plant Licensing) is the next major milestone for FFTF Operator training. Additional requirements or constraints such as operator time utilization, recruiting and turnover, plant availbility and startup testing greatly affect the ability to meet this milestone. These constraints and requirements and the resulting compromises will be evaluated relative to meeting DOE requirements. (ERA citation 04:051641)

HEDL-SA-1728-FP PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Neutron Source Strength in FFTF Fuel as a Function of Irradiation.
P. A. Ombrellaro, and N. E. Petrowicz. Apr 79, 20p CONF-790602-74
Contract EY-76-C-14-2170
ANS annual meeting, Atlanta, GA, USA, 3 Jun 1979.

The neutron source strength associated with fuel irradiated in the FFTF reactor is important in determining the reactivity of the core when it is shut down or being refueled. The monitoring of subcritical reactivity for FFTF will be done with the Modified Source Multiplication (MSM) technique which requires an accurate knowledge of the neutron source strength in high exposure fuel elements replaced with fresh fuel elements in a shut down reactor. As a means of obtaining the most accurate source evaluations possible with existing nuclear data for FFTF irradiated fuel, a technique for generating one-group actinide cross sections for use in isotopic buildup and depletion codes was developed. A further objective of the work was to use the cross sections and recently evaluated spontaneous fission and (alpha ,n) reaction neutron yield data to calculate the neutron source strength in typical compositions of FFTF-type fuel as a function of flux level and irradiation time and then to compare the results with those of a previous study to assess the differences in the nuclear data. This paper will highlight the important aspects of this study and present some results. (ERA citation 04:050020)

HEDL-SA-1749-FP PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Effects of Stoichiometry on Cladding Reaction in Mixed-Oxide Fuel.
L. A. Lawrence. Apr 79, 21p CONF-790602-75
Contract EY-76-C-14-2170
ANS annual meeting, Atlanta, GA, USA, 3 Jun 1979.

Initial fuel stoichiometry (oxygen-to-metal ratio, O/M) has been established as one of the major parameters influencing the character and extent of fuel-cladding chemical interaction (FCCI) in UO sub 2 --25 wt% PuO sub 2 fuels clad with 20% cold worked type 316 stainless steel. How the character of the interaction changes with initial O/M and the O/M dependence that has been established for the depth of interaction are discussed. the data base for this analysis consists of 134 data sets from P-23 series fuel pins irradiated in EBR-II. As-fabricated O/M's ranged from 1.938 to 1.984 with the bulk of the data in the range 1.96 to 1.98. Fuel pins operated to 9.5 atom %, with local cladding inner surface temperatures to 725 exp 0 C, for exposure times to 415 equivalent full power days at heat rates of approx. 400 W/cm. (ERA citation 04:051507)

HEDL-SA-1755-FP PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Comparison of in-Reactor and out-of-Reactor Fuel Pin Cladding Strain under Transient Loading.
D. R. Duncan, C. W. Hunter, J. R. Thielges, T. Hikido, and J. E. Hanson. 1979, 9p CONF-790602-76
Contract EY-76-C-14-2170
ANS annual meeting, Atlanta, GA, USA, 3 Jun 1979.

Results of two recent fuel pin transient tests performed in Mark II-C sodium loops in the TREAT reactor are compared with out-of-reactor transient test results. The TREAT pins were irradiated in EBR-II in the WSA-3 experiment; steady-state irradiation and TREAT test parameters are presented. Out-of-reactor transient tests in the Fuel Cladding Transient Tester (FCTT) measured the deformation and failure behavior of unirradiated specimens and irradiated fuel pin cladding specimens under constant internal gas pressure loading and transient temperature conditions. All fuel pins were 20% cold-worked AISI 316 stainless steel. (ERA citation 04:051673)

HEDL-SA-1759-FP PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Effect of a Time Varying Power Level in EBR-II on Mixed-Oxide Fuel Burnup.
I. Z. Stone, J. W. Jost, and R. B. Baker. 1979, 7p CONF-790602-80
Contract EY-76-C-14-2170
ANS annual meeting, Atlanta, GA, USA, 3 Jun 1979.

A refined prediction of burnup of mixed-oxide fuel in EBR-2 is compared with measured data. The calculation utilizes a time-varying power factor and results in a general improvement to previous calculations. (ERA citation 04:051643)

HEDL-SA-1760-FP PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Influence of Oxygen-Metal Ratio on Mixed-Oxide Fuel Performance.
L. A. Lawrence, and R. D. Leggett. Apr 79, 21p CONF-790602-79
Contract EY-76-C-14-2170
ANS annual meeting, Atlanta, GA, USA, 3 Jun 1979.

The fuel oxygen-to-metal ratio (O/M) is recognized as an important consideration for performance of

uranium--plutonium oxide fuels. An overview of the effects of differing O/M's on the irradiation performance of reference design mixed-oxide fuel in the areas of chemical and mechanical behavior, thermal performance, and fission gas behavior is presented. The pellet fuel has a nominal composition of 75 wt% UO sub 2 + 25 wt% PuO sub 2 at a pellet density of approx. 90% TD. for nominal conditions this results in a smeared density of approx. 85%. The cladding in all cases is 20% CW type 316 stainless steel with an outer diameter of 5.84 to 6.35 mm. O/M has been found to significantly influence fuel pin chemistry, mainly FCCI and fission product and fuel migration. It has little effect on thermal performance and overall mechanical behavior or fission gas release. The effects of O/M (ranging from 1.938 to 1.984) in the areas of fuel pin chemistry, to date, have not resulted in any reduction in fuel pin performance capability to goal burnups of approx. 8 atom% or more. (ERA citation 04:051508)

HEDL-SA-1769 PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Analysis of Piping Systems with Nonlinear Supports Subjected to Seismic Loading.
D. A. Barta. Mar 79, 23p CONF-790615-18
Contract EY-76-C-14-2170
US national congress on pressure vessels and piping, San Francisco, CA, USA, 25 Jun 1979.

An analytical study of effects of nonlinearities in piping supports on response to seismic excitation is presented. Response calculations for simplified single degree of freedom nonlinear models are used to illustrate sensitivity to stiffness variations, lost motion and impact damping. Seismic responses of typical spans of various sizes of piping supported by both linear and nonlinear constraints are compared to assess the support load magnifications due to impacting. The idealized nonlinear piping support models are integrated with a finite element model of a large piping system. Time domain seismic responses of the nonlinear piping system are compared to loads determined by a standard linearized seismic response spectra technique. (ERA citation 04:051674)

HEDL-SA-1773 PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Experience with Simplified Inelastic Analysis of FFTF Test Assemblies.
B. V. Winkel. Feb 79, 18p CONF-790615-22
Contract EY-76-C-14-2170
US national congress on pressure vessels and piping, San Francisco, CA, USA, 25 Jun 1979.

Included in the more recent design activities for the Fast Flux Test Facility (FFTF) are a series of test assemblies which will contain experiments in the FFTF reactor. Due to high operating temperatures and severe thermal transients, inelastic analysis is generally required to demonstrate structural adequacy. Based upon previous FFTF experience, a number of simplifications have been made to reduce the inelastic analysis effort. Significant time and cost savings have resulted. (ERA citation 04:053220)

HEDL-SA-1787-FP PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Failure Location Analysis for Tagged Reactor Assemblies.
J. A. Figg. Mar 79, 12p CONF-790698-2
Contract EY-76-C-14-2170
Society of Women Engineers national student conference, San Francisco, CA, USA, 27 Jun 1979.

The location of defective LMFBR fuel pins by the determination of gas tag isotopic ratios is discussed. The application of this method to the FFTF Reactor briefly described. (ERA citation 04:051510)

HEDL-SA-1794 PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Experience in the Use of FBR Core Component Structural Design Criteria as Applied to FFTF.
S. L. Hecht. 1979, 10p CONF-790615-23
Contract EY-76-C-14-2170
US national congress on pressure vessels and piping, San Francisco, CA, USA, 25 Jun 1979.

User gained experience resulting from trial applications of proposed structural design guidelines for Fast Breeder Reactor (FBR) core components is presented. This work was done supporting the design analyses process for consumable core components for the Fast Test Reactor (FTR) of the Fast Flux Test Facility (FFTF). The proposed guidelines were found to be more comprehensive and generally easier to apply than those methods previously used. Component evaluation required a minimum amount of detailed inelastic analysis, primarily through the use of simplified inelastic analysis methods, as given in the guidelines. A major shortcoming of this draft criteria/guidelines is a lack of supporting irradiated material properties. Some areas of guidance given seems ambiguous and may be non-conservative, particularly those related to stress classification unique to FBR environments. Further verification of these areas appears to be in order. (ERA citation 04:053221)

HEDL-SA-1838-FP PC **A03**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
CORA: Transient Analysis Code for a Cluster of Reactor Core Assemblies.
H. G. Johnson. 25 Apr 79, 29p CONF-790602-78
Contract EY-76-C-14-2170
ANS annual meeting, Atlanta, GA, USA, 3 Jun 1979.

The CORA code is a steady state/transient, core thermal hydraulics code for the FFTF Reactor. A brief overview of the code development and use is presented. (ERA citation 04:051644)

HEDL-6617 PC **A12**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Computerized Interference Elimination Report: FFTF Cells 489, 422E, 529A, and 529B.
1979, 258p
Contract EY-76-C-14-2170

Design information is presented concerning the possible piping interferences in FFTF cells 489, 422E, 529A, and 529B. (ERA citation 04:053217)

IDO-1570-T12 PC **A04**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
LOFT Monthly Progress Report for May 1979.
Jun 79, 75p
Contract EY-76-C-07-1570

LOFT personnel successfully performed the second nuclear experiment in the power ascension series, L2-3, on May 12 after several months of preparations. Satisfactory initial conditions were achieved, including a maximum linear heat generation rate of 39.4 kW/m. Core rewet, which occured early in the blowdown phase, influenced core thermal response. This was similar to the results of experiment L2-2. Costs through May continue to be less than budgeted, primarily as a result of material costs accrued but not costed, some necessary rescheduling, and cost savings not yet reflected in Change Control Board actions. Initial work to accelerate the Small Break Series with consequent deferral of the remaining Power Ascension Series experiments has begun. (ERA citation 04:048682)

IDO-1570-T13 PC **A07**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
WRRD Monthly Report for May 1979.
Jun 79, 130p
Contract EY-76-C-07-1570

Cost data and brief technical summaries are presented for the LWR research activities: semiscale program, thermal fuels behavior program, 3-D program, code development and analysis, code assessment and applications, and construction for GPP and line items. (ERA citation 04:051678)

IDO-1570-T15 PC **A04**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
LOFT Monthly Progress Report for June 1979.
Jul 79, 69p
Contract EY-76-C-07-1570

Following the very successful conduct of LOFT experiments L2-3 and L3-0 in May, the project emphasis shifted toward removal of the center fuel module changeout was performed to verify by physical inspection that the fuel configuration was unaffected by the two nuclear and one nonnuclear loss-of-coolant tests that simulated a 200% break in the primary cooling system. In addition to preparation for fuel changes, reviews were started to examine the budget and work scope impact associated with accelerating small break tests now planned for FY-81. Recommendations will be made in July to the Nuclear Regulatory Commission about the desirability of and problems associated with such a program change. Costs in June continued at less than budgeted levels. This resulted from savings achieved to date, rescheduling and deferrals associated with program orientation changes, and uncosted but incurred liabilities. The cumulative underrun and the projected cost to complete for FY-79 are now under intensive review in order to balance funding against desired program changes. This review will be completed in July. (ERA citation 04:050049)

IDO-1570-T18 PC **A03**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
Supplement to Quick Look Report (QLR) L2-3, Kau-162-79.
N. C. Kaufman. 19 Aug 79, 37p
Contract EY-76-C-07-1570

The pretest calculations of LOFT nuclear Loss-of-Coolant Experiment (LOCE) L2-3 are summarized. LOCE L2-3 was designated United States Standard Problem 10 by the Nuclear Regulatory Commission (NRC) and pretest calculations were performed by several official participants and other groups. The organizations making calculations, the computer codes used, and a brief summary of results are included. (ERA citation 04:053243)

IDO-1570-T20 PC **A08**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
WRRD Monthly Report for July 1979.
Aug 79, 156p
Contract EY-76-C-07-1570

Cost summaries are provided for the following: semiscale experiments, thermal fuels behavior program, 3-0 program, code development and analysis program, code assessment and applications program, and construction. (ERA citation 04:053244)

IKE-6-117 PC **A07**/MF **A01**
Stuttgart Univ. (Germany, F.R.). Inst. fuer Kernenergetik und Energiesysteme.
Calculation of Plutonium Build-Up in the Fuel Pin, Taking into Account the Interactions Between Different Resonance Lines in the Epithermal Region.
Diss. (D.Eng.),
P. Owono-Ateba. Nov 78, 135p
In German.
U.S. Sales Only.

The radial distribution of plutonium isotope concentrations in PWR fuel pins is calculated in dependence of burn-up. For this, the fuel zone of the fuel pin is divided into 2 or 5 zones. Cell burn-up calculations are carried out for 58 energy groups. For the epithermal range between 47.85 eV and 185 eV with the 3 main absorption resonances of U exp 238 the space-dependent group cross sections calculated by the first collision method are used. There is good agreement with experimental findings as faor as time-dependent changes and the spatial distribution of uranium concentrations are concerned. (Atomindex citation 10:452764)

INIS-mf-4877 PC **A10**/MF **A01**
Smallest Resistance Welds in Nuclear Reactor A 1.
F. Majerko. Sep 75, 201p CONF-7509213-P2
International school of welding, Tatranska Lomnica, Czechoslovakia, 29 Sep 1975.
U.S. Sales Only.

The properties were studied of the welded joints of spacers securing the position of fuel rods in the A-1 reactor technological channel. The spacers were made of zirconium alloyed with Mo and Cu (material C2M). The corrosion resistance, structural changes and changes in mechanical properties of the material during long-term irradiation were stud-

ied. Specimens were tested using the resistance method of a welded strip having dimensions of 60x8x0.3 mm. The resistance spot diameter was 1.1 to 1.2 mm. The tested specimens were placed in a corrosive medium and strained, first statically and later cyclically for a maximum of 5000 hours. The welded joint strength decreased by 20 to 25%. Welding proceeded at a current of 2.5 kA for a maximum of 5 s. The so-called protectors were designed, i.e., fixtures for the welding and assembly of the fuel rod spacing lattice and of the spacing elements. During the first campaign no fuel element faults were found due to defective welded joints. (Atomindex citation 10:451653)

INIS-mf-4878 PC **A10**/MF **A01**
Radiation Control System of Nuclear Power Plants.
V. Kapisovsky, M. Kosa, Z. Melichar, J. Moravek, and O. Jancik. 1977, 201p CONF-7711125-
In Slovak.Conference on modular systems for data acquisition and processing, Prague, Czechoslovakia, 8 Nov 1977.
U.S. Sales Only.

The SYRAK system is being developed for in-service radiation control of the V-1 nuclear power plant. Its basic components are an EC 1010 computer, a CAMAC system and communication means. The in-service release of radionuclides is measured by fuel can failure detection, by monitoring rare gases in the coolant, by gamma spectrometric coolant monitoring and by iodine isotopes monitoring in stack disposal. (Atomindex citation 10:452289)

INIS-mf-4903 PC **A16**/MF **A01**
Kinetics of Bubble Formation in Fissile Materials.
Eh. Ya. Mikhlin, and V. F. Chkuaseli. 1978, 351p CONF-7805178-P2
In Russian.Conference on reactor materials science, Alushta, Ukrainian SSR, 29 May 1978.
U.S. Sales Only.

The model enabled the kinetics of bubble formation in fissile and some other materials to be described where irradiation induced nuclear reactions result in a solid solution supersaturated with inert gases has been developed. The conclusion has been drawn that the mechanism of coalescence of random walking bubbles is a principal one for bubble formation observed both on and outside of dislocations. (Atomindex citation 10:451914)

INIS-mf-4911 PC **A06**/MF **A01**
Technische Univ., Hanover (Germany, F.R.). Fakultaet fuer Maschinenwesen.
Investigations of Temperature Fluctuations in Liquid Sodium in Order to Determine Characteristic Flow Parameters and Thermocouple Transfer Functions.
J. Benkert. 1977, 104p
In German.Diss. (D.Eng.).
U.S. Sales Only.

Because of narrow geometries and high thermal loads mainly thermocouples are used to monitor the coolant state in the reactor core, the heat exchangers and the piping. The aim of the present paper is to determine the transfer behavior of different types of thermocouples, the local influencing of the temperature fluctuations and to what extent the heat transfer coefficient fluid/wall may be evaluated from the measurements performed. The experiments to study these problems were carried out in three test beds for liquid sodium. The good agreement between model calculations and the experiments made allow the experimenter to make interpretations of extreme flow conditions on one hand and the owners of plants to select and apply optimally thermocouples under normal operating conditions on the other. (Atomindex citation 10:452502)

INKA-Conf-78-078-002
PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation Eggenstein-Leopoldshafen (Germany, F.R.).
Response of Unirradiated and Irradiated PWR Fuel Rods Tested under Power-Cooling-Mismatch Conditions.
P. E. MacDonald, W. J. Quapp, Z. R. Martinson, R. K. McCardell, and A. S. Mehner. 1978, 25p CONF-781147-10
Meeting of the projekt nukleare sicherheit, Karlsruhe, F.R. Germany, 28 Nov 1978.
U.S. Sales Only.

This report summarizes the results from the single-rod power-cooling-mismatch (PCM) and irradiation effects (IE) tests conducted to date in the Power Burst Facility (PBF) at the U.S. DOE Idaho National Engineering Laboratory. This work was performed for the U.S. NRC under contact to the Department of Energy. These tests are part of the NRC Fuel Behavior Program, which is designed to provide data for the development and verification of analytical fuel behavior models that are used to predict fuel response to abnormal or postulated accident conditions in commercial LWRs. The mechanical, chemical and thermal response of both previously unirradiated and previously irradiated LWR-type fuel rods tested under power-cooling-mismatch condition is discussed. A brief description of the test designs is presented. The results of the PCM thermal-hydraulic studies are summarized. Primary emphasis is placed on the behavior of the fuel and cladding during and after stable film boiling. (Atomindex citation 10:452761)

INKA-Conf-78-078-003
PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation Eggenstein-Leopoldshafen (Germany, F.R.).
Thermal-Hydraulically Controlled Blowdown Tests in the Experimental Facility COSIMA to Study PWR Fuel Behavior: Experimental and Theoretical Results.
G. Class, K. Hain, and R. Meyder. 1978, 22p CONF-781147-9
In German.Meeting of the projekt nukleare sicherheit, Karlsruhe, F.R. Germany, 28 Nov 1978.
U.S. Sales Only.

The fuel behavior in the blow-down phase of a LOCA is of importance for fuel rods with high internal pressure and high rod power, because of the effects on clad failure of the small cladding deformations occurring. The operating results of the COSIMA facility show that, on the basis of the new developments for measuring technique and fuel rod simulators performed, reactor relevant blowdown performances can be conducted in a controlled and reproduceable manner. The mechanical and thermal-hydraulic states occurring in the test bed may be subject to computational checking. This permits on one hand to improve the computing models and on the other yields a confirmation of the high state of development of the available computer codes. Therefore it appears that, with the results from COSIMA and the associated theoretical work in the field of the blow-down process, difficult to treat experimentally, an essential contribution to verifying the models for accident calculations is given. The work scheduled for the next about 1 1/2 years will serve to further support the rather preliminary results and to extend the range of then application. (Atomindex citation 10:452752)

INKA-Conf-78-078-005
PC **A03**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation Eggenstein-Leopoldshafen (Germany, F.R.).
Methods of Analysis for Core Meltdown Accidents in Light Water Reactors.
R. S. Denning, P. Baybutt, P. Cybulskis, J. A. Gieseke, and H. Jordan. 1978, 26p CONF-781147-8
Meeting of the projekt nukleare sicherheit, Karlsruhe, F.R. Germany, 28 Nov 1978.
U.S. Sales Only.

This paper describes the status of two research programs at the Battelle, Columbus Laboratories, in which improved methods of analyzing the behavior of hypothetical fuel melting accidents in LWR being developed. In one program the MARCH/CORRAL code package has been written to perform an integrated analysis of thermal-hydraulic response and radionuclide transport within containment in meltdown accidents. In the other program, the TRAP code is under development for the analysis of radionuclide transport and deposition in the reactor primary system. (Atomindex citation 10:452729)

INKA-Conf-78-078-006
PC **A03**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation Eggenstein-Leopoldshafen (Germany, F.R.).
Fission Product Source Terms for LOCAs and Hypothetical Core Melt-down Accidents.
H. Albrecht, and A. P. Malinauskas. 1978, 31p CONF-781147-6
In German.Meeting of the projekt nukleare sicherheit, Karlsruhe, F.R. Germany, 28 Nov 1978.
U.S. Sales Only.

This paper describes two experimental projects for the study of fission product release at different boundary conditions. By the work done at Oak Ridge until now the temperature range of the loss-of-coolent accident (500-1200 exp 0 C) is covered; in additional experiments this range is extended to 1600 exp 0 C. The results obtanied are of special importance for the fission products Cs and I, for they mean to say that the release at 1200 exp 0 C is lower by the factors of 200 respectively 60 than assumed in the Rasmussen Report. For the calculation of the source term for these elements a semiempirical model was developed, well describing the experimental results from several series of experiments despite much different boundary conditions. In the PNS experimental program the release for hypothetical core melt-down accidents in the temperature range between 1200 and 2700 exp 0 C is studied. With the melt-down facility SASCHA, described in this paper, for the first time experiments can be performed at realistic boundary conditions with melted masses of up to at least 1 kg. Set up and development of the experimental technique taking several years, for the present there are not enough experimental data available for the calculation of the integral source term under core melt-down conditions. Nevertheless the release in air for about a dozen elements and melted masses of 30-300 g could be determined. (Atomindex citation 10:452724)

INTAT-78-70 PC **A06**/MF **A01**
Shutdown Concepts of High-Temperature Reactors.
S. Brandes, G. Lohnert, L. Wolf, and W. Dietz. Aug 78, 101p CONF-7711123-
In German.KTG special meeting of the Fachgruppe Brennelemente, Bergisch Gladbach, F.R. Germany, 25 Nov 1977.
U.S. Sales Only.

The present meetings report gives a survey an the state of development of absorbers of high-temperature reactors. Numerous materials, material combinations and geometrical configurations are for neutron-physical reasons possible for various reactor concepts of control and shutdown. Boron carbide is primarily the reference material in HTR, however numerous alternatives to realize long-term project targets are being still persued. (Atomindex citation 10:449495)

Juel-1527 PC **A05**/MF **A01**
Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Programmgruppe Systemforschung und Technologische Entwicklung.
Study on the Profitability of Electricity Generation with High Temperature Reactors.
G. Kolb. Aug 78, 97p
In German.
U.S. Sales Only.

The programme group 'Systemforschung und Technologische Entwicklung' (STE) of the Nuclear Research Centre Juelich in cooperation with the internal institutions 'Projekttraegerschaft Entwicklung von Hochtemperaturreaktoren' (PTH) and 'Institut fuer Reaktorentwicklung' (IRE) on the one hand, and the external partner 'Hochtemperatur-Reactorbau GmbH' (HRB) and 'Gesellschaft fuer Hochtemperaturreactor Technik' (GHT) on the other hand have set up a study on fuel cycle costs, electricity production cost and the economical use as well as uranium resource protection by introduction of high temperature reactors (HTR) with pebble bed core to generate electricity. The pressurized-water reactor (PWR) today on the market serves as comparison. The working results obtained sofar are compiled in the present report. It was particularly noted that - the HTR can economically fully compete with the PWR for electricity generation - the necessary supply of natural uranium for the HTR in open circuit is about one third lower and in the closed circuit, almost two thirds lower than in the corresponding PWR. A further reduction is possible on a long-term basis by highly converting HTW systems. (Atomindex citation 10:450105)

JAPFNR-434 PC **A02**/MF **A01**
Power Reactor and Nuclear Fuel Development Corp., Tokyo (Japan).
Hydraulic Simulation of Local Blockage in LMFBR Fuel Subassembly.
H. Nakamura, K. Miyaguchi, and J. Takahashi.
Jan 79, 13p PNC-N-941-79-07
Work performed under United States--Japanese Fast Reactor Exchange Program.
U.S. Sales Only.

Experimental studies on the local flow blockage in LMFBR subassembly have been conducted to investigate the safety assessment. The water modeling tests have been carried out, in parallel with the development of the code UZU. Fundamental data on the flow field in a pin bundle containing a blockage have been accumulated and applied to check on uncertainities which came upon in the development of the code. The summary of the experimental results is presented. (ERA citation 04:046646)

JEN-429 PC **A04**/MF **A01**
Junta de Energia Nuclear, Madrid (Spain).
Importance of Transient Analysis in the Light Water Reactor Licensing Procedure.
J. M. Izouierdo, and J. I. Villadoniga. 1979, 75p
In Spanish.
U.S. Sales Only.

The basic principles of the Nuclear Regulation are developed in the first part of this report. The achievement of the safety objective by establishing protections -that prevent or reduce the barriers failure- is analyzed. An iterative method for the definition of the systems and components safety design bases is proposed, analyzing the role of Technical Specifications in this process. The second part shows how this methodology can be used in the case of the first barrier: the fuel cladding. The safety criteria, transient clasification problems, transient analysis and its relation with surveillance and protection systems, and the role of such analysis in fuel protection design verification are discused. (Atomindex citation 10:452287)

KFK-2408 PC **A04**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Projekt Spaltstoffflusskontrolle.
Application of Isotopic Correlation Technique to Safeguards.
R. Berg, W. Fuhse, L. Koch, D. Gupta, and H. W. Wiese. Dec 77, 73p EUR-5752d
In German.
U.S. Sales Only.

The methods of isotopic correlations are gaining increasing importance in connection with nuclear safeguards. The R and D activities in this area, in the framework of the Safeguards Project, have been intensified. In this report, four papers summarize the present state of the art of these methods. The last paper indicates the areas in which further R and D work would be required. (Atomindex citation 10:450170)

KFK-2668 PC **A03**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Neutronenphysik und Reaktortechnik.
Analysis of Sodium-Void Experiments in ZPPR-3 Modified Phase 3 Core.
T. Yoshida. Aug 78, 45p
Work performed under United States--W. Germany Fast Reactor Exchange Program.
U.S. Sales Only.

An analysis is presented of a series of sodium-void reactivity measurements performed in assembly 3 of Zero Power Plutonium Reactor (ZPPR-3), a mockup of the US Demoplant. In this series, large-zone sodium-void effects were studied in detail in the presence of many singularities, namely, control rods (CRs) and control rod positions (CRPs). The Karlsruhe data-and-method have been applied to an analysis of these experiments, and the results are presented. The work is aimed at complementing the sodium-void reactivity analysis based on the SNEAK experiments, where it was difficult to simulate a large plutonium-core of a prototype fast breeder reactor. (ERA citation 04:049930)

KFK-2691 PC **A02**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Projekt Nukleare Sicherheit.
Fuel Element Behavior During a Loss-of-Coolant Accident and Interaction with the Emergency Core Cooling.
F. Erbacher. Sep 78, 24p
In German.
U.S. Sales Only.

The process of emergency core cooling in a LOCA of a pressurized water reactor is summarized. The thermohydraulics in the reactor core and the loading of the fuel rod claddings during a LOCA are covered in more detail. Some recent experimental results on Zircaloy cladding deformation in a LOCA are discussed. They indicate that axial and azimuthal cladding temperature differences, which are enhanced by cooling during reflooding, are limiting the strains of the Zircaloy cladding tubes and the resulting coolant channel blockage in the fuel elements. (Atomindex citation 10:449571)

KFK-2701 PC **A06**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Abt. fuer Angewandte Systemanalyse.
Consequences of Large-Scale Implementation of Nuclear Energy in the Federal Republic of Germany. Pt. 1. Large-Scale Implementation of Nuclear Energy in the Federal Republic of Germany - Nuclear Fuel Demand and Possible Problems of Supply.
H. Paschen, H. Tangen, and D. Wintzer. Oct 78, 103p ASA/ZE-10/78
In German.
U.S. Sales Only.

Three scenarios of the future installation of nuclear capacity in the Federal Republic of Germany are selected on the basis of assumptions concerning long-term demand of primary energy and other factors of influence for the expansion of nuclear energy. The corresponding demand for natural uranium, the requirements for separative work and fuel fabrication, and the situation with regard to reactor construction capacity are described. Because of the heavy dependence of the Federal Republic of Germany on uranium imports, the worldwide development of uranium demand and supply is discussed in some detail. For this purpose, the dependence of the yearly and cumulative uranium demand on the type and the time and speed of introducting of breeding or high converting reactors is analysed. The uranium demand situation and possible difficulties on the supply side are described against the background of uranium reserve and resource data. (Atomindex citation 10:450090)

KFK-2706 PC **A03**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Abt. fuer Angewandte Systemanalyse.
Consequences of Large-Scale Implementation of Nuclear Energy in the Federal Republic of Germany. Pt. 6. Nuclear Material Control.
H. Paschen, and R. Avenhaus. Oct 78, 35p ASA/ZE-15/78
In German.
U.S. Sales Only.

Nuclear material requires special protective measures because of its great economic importance, its toxicity (especially plutonium), and its military value. Usually the total complex of nuclear material control is subdivided into a) physical protection measures which are applied to protect nuclear material and installations, and b) international safeguards which are intended to reduce the hazard of nuclear proliferation. In this paper, the present technological and organizational status and some open questions of international nuclear material safeguards are presented in some detail. Physical protection will be touched upon only briefly, as the measures to be taken here do not differ, in principle, from those to be taken elsewhere. (Atomindex citation 10:450188)

KFK-2716 PC **A05**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Neutronenphysik und Reaktortechnik.
Structure of Turbulent Flow Through a Wall Subchannel of a Rod Bundle with Roughened Rods.
K. Rehme. Nov 78, 96p
U.S. Sales Only.

An experimental investigation was undertaken in order to obtain information on the transport properties of turbulent flow through a wall subchannel of a rod bundle with roughened rods and a smooth channel wall. Detailed measurement values were obtained on the distributions of mean flow velocity, intensity of turbulence in all directions and thus the kinetic energy of turbulence as well as the shear stresses perpendicular and parallel to the walls and of the wall shear stresses on the smooth wall. The rod bundle consisted of four parallel rods contained in a rectangular channel; the Reynolds number of this investigation was Re=1.82 x 10 exp 5 . From the measurement values the eddy viscosities in the directions perpendicular and parallel to the walls were calculated. The results are compared with predictions calculated by the VELASCO code. (Atomindex citation 10:449218)

LA-UR-79-1874 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Overview and Status of the SIMMER Testing Program.
J. H. Scott. 1979, 13p CONF-790816-16
Contract W-7405-ENG-36
International meeting on fast reactor safety technology, Seattle, WA, USA, 19 Aug 1979.

Los Alamos Scientific Laboratory has undertaken an extensive experiment analysis program to test the results of SIMMER Liquid Metal Fast Breeder Reactor (LMFBR) accident calculations. Initially, we will test the postdisassembly work-energy partition problem. The SIMMER-calculated order-of-magnitude reduction of available kinetic energy following a severe hypothetical core-disruptive accident (HCDA) can be attributed to (1) purely fluid-dynamic effects; and (2) rate-controlled effects, such as phase transitions and heat transfer. We have chosen to test separately each class of mitigator. In this paper we review the experiments initially chosen for testing of each class of mitigator and report on the status of the analyses. We enumerate several problems in SIMMER that experiment analysis has disclosed. Finally, needs for future experiments are discussed. (ERA citation 04:051684)

LA-UR-79-1918 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
SIMMER-II Code and Its Applications.
L. L. Smith. 1979, 11p CONF-790816-13
Contract W-7405-ENG-36
International meeting on fast reactor safety technology, Seattle, WA, USA, 19 Aug 1979.

The significant features of SIMMER-II, a disrupted-core analysis code, are described. The code has the capabalities to begin space-time neutronics calculations from nonstationary reactor states, to track the intermixing of fuel of different enrichments, and to model the complicated heat- and mass-transfer processes that occur in the transition phase. Example calculations are presented for analyses of whole-core accidents and for analyses of experiments supporting the code models. (ERA citation 04:048700)

LA-7878-PR PC **A08**/MF **A01**
Los Alamos Scientific Lab., NM.
Reactor Technology. Progress Report, January--March 1979.
M. Breslow. Jun 79, 155p
Contract W-7405-ENG-36

Significant progress is reported in the technical feasibility program of the Space Reactor Technology Program, including: thermoelectric material samples were made with an implied overall converter efficiency of 8.5%; maximum UO sub 2 -fuel temperature in the core was computed to be approximately 1700 K with contact requirement between the molybdenum fins and core heat pipe of 10-15%; a design reliability of 0.99 for the core heat pipes and thermo-electric modules has been established; and an assessment of power-plant requirements indicates we can meet our original design goals. Activities in the Reactor Structural Investigations Program included work in the experimental seismic program and structural work related to the Fort St. Vrain temperature fluctuation problem. Work on the Ceramic Heat Pipe Technology Development Program has included the experimental determination of the operating characteristics of ceramic heat pipe configurations, resolution of necessary heat pipe fabrication methods, and investigation of basic heat pipe operating

characteristics for both the mercury heat pipe and for an annular heat pipe used for optical system cooling. The Nuclear Criticality Operations and Safety Program is investigating the development of a solution burst reactor, which could deliver a leakage neutron flux of sufficient magnitude and proper spectrum to be of interest for weapon-component vulnerability studies. Preliminary experiments have been conducted by the Nuclear Pumped Laser Program to measure the efficiency of conversion of fission fragment energy to excited electronic state energy. (ERA citation 04:051551)

LTR-111-127 PC **A13**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
L2-3 Pre-LOCE Maneuver Core Safety Analysis.
S. A. Atkinson, and D. G. Satterwhite. 19 Apr 79, 300p
Contract EY-76-C-07-1570

The core safety analyses and reactivity control analyses that have been done to support safe operation of the LOFT reactor in the LOCE pre-blowdown (or pre-LOCE) operating mode (Operating Mode 8) for the L2-3 nuclear loss of coolant experiment are presented. Safety analyses done to support LOFT operation in other operating modes (Modes 5, 6, and 7) with changes in operating conditions or assumptions due to requirements for safe operation of the L2-3 test (changes from conditions or assumptions for previous safety analyses for those operating modes) are also presented. The analyses discussed herein do not include analyses for potential loss of coolant accidents, or for accidents during the LOCE blowdown mode (Mode 9), or for potential radiation releases during LOCE operation. (ERA citation 04:046649)

LTR-141-103 PC **A04**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
Results of Tests to Evaluate the Use of an In-Core Liquid Level Transducer (LLT) To Measure Void Fraction.
R. L. Hoskinson, and H. J. Helbert. 18 May 79, 51p
Contract EY-76-C-07-1570

The results are presented of tests conducted at the LOFT Test Support Facility (LTSF) using a Liquid Level Transducer (LLT) to measure void fraction. The LLT used was an in-core transducer S/N 445. The purpose of these tests was to evaluate the LLT as a void fraction measuring instrument. Tests were conducted at atmospheric pressure and room temperature by partially filling a test column with demineralized water and bubbling oxygen from the bottom. The liquid level was measured with a metric rule on the side of the test column before any gas injection. (ERA citation 04:051649)

LTR-20-100 PC **A05**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
RELAP4/MOD6 Predictions Comparisons with LOFT LOCE L2-2 Data.
E. J. Kee, and J. R. White. 3 May 79, 93p
Contract EY-76-C-07-1570

Comparisons are made between RELAP4/MOD6 predicted and experimental measured quantities for Loss-of-Fluid Test Loss-of-Coolant Experiment L2-2. These data comparisons provide a detailed record for subsequent analysis. Comparisons indicate that the trends in the system hydraulic response were generally predicted well. However, the broken cold leg break flow was probably overpredicted in subcooled and saturated critical flow which led to an incorrect core flow which resulted in overpredicting the fuel rod cladding surface temperature response. (ERA citation 04:048701)

LTR-20-103 PC **A05**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
Preliminary Posttest Analysis of LOFT Loss-of-Coolant Experiment L2-2.
J. R. White, W. H. Grush, and C. D. Keeler. Jun 79, 100p
Contract EY-76-C-07-1570

A preliminary posttest analysis of Loss-of-Coolant Experiment (LOCE) L2-2, which was conducted in the Loss-of-Fluid Test (LOFT) facility, was performed to gain an understanding of the cause of the disparity between predicted and measured fuel rod cladding temperature responses in the LOFT core. LOCE L2-2 is the first experiment in the LOFT Power Ascension Series L2 (first series of LOFT nuclear experiments), which was designed to investigate the response of the LOFT nuclear core to the blowdown, refill, and reflood transients during LOCEs conducted at gradually increasing power levels. LOCE L2-2 was conducted at 50% power (25 MW, 26.38 kW/m). Results show that a core-wide rewet occurred early in the transient (during blowdown starting at about 7 s after rupture) which was not calculated in the pretest prediction analysis. This early core-wide rewet resulted in the peak fuel rod cladding temperatures being lower (by a mean value of 166 exp 0 K for 24 thermocouples) than had been calculated. This preliminary posttest analysis was concerned solely with determining why the early core-wide rewet was not predicted by the RELAP4/MOD6 pretest analysis and be no means is it a complete posttest analysis of LOCE L2-2 results. However, during this analysis, several errors made in the prettest analysis were found, and their impact on the predicted results is assessed. Three factors were postulated to have caused the disparity between predicted and measured fuel rod cladding temperatures for LOCE L2-2: (a) the initial fuel rod stored energy, (b) the heat transfer surface, and (c) the hydraulics calculation. These factors were examined and are discussed in this report. It was determined that core hydraulics, as influenced by the calculation of broken loop cold leg break flow, was the major factor causing the disparity. (ERA citation 04:048702)

NUREG/CR-0470 PC **A09**/MF **A01**
Sandia Labs., Albuquerque, NM.
Advanced Reactor Safety Research. Volume 8.
Quarterly rept. Jul-Sep 78,
Nov 79, 193p SAND-78-2002
See also NUREG/CR-0335.

Sandia has been tasked to investigate seven major areas of interest which are intimately related to overall NRC needs. These are: Energetics, Fuel Dynamics, Core Debris Behavior - Inherent Retention, Aerosol Source Normalization, Elevated Temperature Design Assessment, LMFBR Accident Delineation, and Test and Facility Technology. These major tasks are subdivided as necessary into subtasks to facilitate the organization of work and the interaction of subtask results into a body of coherent information which supports the requirements of NRC. This document presents the progress on these tasks during the July-September 1978 Quarter.

NUREG/CR-0662 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Computational Tools for Material Control Assessment and Design of Processing Monitors: An Overview.
Technical rept.,
D. R. Dunn, J. V. Candy, and J. G. Huebel. Feb 79, 30p UCRL-52702

This report reviews several computer codes (DYNSYL, DYNEST, and DDET) that have application in the assessment and design of Material Control and Accounting process monitor components. The report emphasizes that the tools and procedures required for performance modeling are also applicable to the design of safeguard process monitors.

NUREG/CR-0790 PC **A04**/MF **A01**
Sandia Labs., Albuquerque, NM.
Topical Report on Fuel Motion Diagnostic Systems,
S. A. Wright. Nov 79, 72p SAND-79-0909

The Specialist Meeting on Fuel and Clad Motion Diagnostics for Fast Reactor Safety Test Facilities took place on 5-7 December 1977 in Los Alamos, New Mexico. This report contains the papers contributed by Sandia. Since the meeting, the authors have updated their written contributions to include accomplishments as of December 1977. The first three papers address the topic of coded aperture imaging. The first paper describes two experiments showing that fuel pins illuminated by reactor radiation can be observed and that collimators can be designed to give more-than-adequate signal-to-background ratios. The second paper discusses the methods of analog and digital reconstruction of pseudoholograms. The third paper treats imaging in large fuel pin bundles. Both gamma radiation and fast neutrons are considered as imaging sources. The final two papers deal with alternative techniques for monitoring fuel motion by addressing in-core fuel motion detection and flash x-radiography. The paper on in-core fuel motion detection describes the mathematical relationship between detector response and fuel motion. The paper on flash x-radiography defines the X-ray source required and describes experiments which illustrate the problems of imaging fuel motion under conditions of poor geometry.

NUREG/CR-0791 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
The Structured Assessment Analysis of Facility X. Volume I. Executive Summary.
Technical rept.,
A. A. Parziale, I. J. Sacks, T. R. Rice, and S. L. Derby. Nov 79, 44p UCRL-52765
Prepared in cooperation with Applied Decision Analysis, Inc.

This report presents the results of the assessment of the Material Control and Accounting System of a typical facility for highly enriched nuclear fuel. The analysis of this facility was conducted using the Structured Assessment Approach developed at the Lawrence Livermore Laboratory under U.S. Nuclear Regulatory Commission sponsorship. The analysis uncovered significant vulnerabilities within the Material Control and Accounting System to an insider threat.

NUREG/CR-0846 PC **A03**/MF **A01**
Sandia Labs., Albuquerque, NM.
Analysis of ORNL Pipe Ratchetting Tests TTT-1 and TTT-2,
Daniel V. Swenson. Nov 79, 31p SAND-79-1057

As part of the Nuclear Regulatory Commission program on Elevated Temperature Design Assessment, Sandia Laboratories is participating in the benchmark effort. This report presents the results of an analysis of the first benchmark problem. This benchmark problem is based on an experiment performed at the Oak Ridge National Laboratory to obtain data for qualification of high temperature inelastic analysis methods. Both the material and loadings are representative of conditions in a Liquid Metal Fast Breeder Reactor. In the experiment two straight pipe test specimens were subjected to thermal downshocks, changes in internal pressure, and creep at elevated temperature. These loadings produced progressive inelastic deformations (ratchetting) of the test specimens.

NUREG/CR-0914 PC **A04**/MF **A01**
Sandia Labs., Albuquerque, NM.
Visual Investigation of Reactor Fuels Response to Simulated LOF Heating Conditions, First Series,
Gilbert L. Cano, Raymond W. Ostensen, and Michael F. Young. Nov 79, 74p SAND-79-0940

In a loss-of-flow (LOF) accident in an LMFBR, the mode and timescale of disruption of fuel can establish the probability of a subsequent energetic excursion. To investigate these phenomena, in-pile disruption of interral-fission-heated fuel pellets, both fresh UO and preirradiated mixed oxide, was recorded by high speed cinematography. Neither fuel frothing nor dust-cloud breakup occurred under the simulated LOF conditions. Instead massive and very rapid fuel swelling, not predicted by current transient fuel-swelling and gas-release models, occurred. This may be the initial and dominant mode of fuel disruption in an LOF. A new transient fuel-swelling model, FISGAS, has been developed at Sandia.

NUREG/CR-0964 PC **A05**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
A Feasibility Study for a Computerized Emergency Preparedness Simulation Facility.
Final rept. Oct 78-Jun 79,
L. H. Gerhardstein, J. O. Schroeder, and W. F. Sandusky. Nov 79, 93p PNL-3043

This report details the feasibility of a computerized Emergency Preparedness Simulation Facility

(EPSF) for use by the Nuclear Regulatory Commission (NRC). The proposed facility would be designed to provide the NRC and other Federal, State and local government agencies with a capability to formulate, test, and evaluate the Radiological Emergency Response Plans (RERP). When an emergency exists, rapid mobilization of emergency teams, efficient communication, and effective coordination of emergency teams, efficient communication, and effective coordination of individual team efforts is essential to safety, preservation of property, and overall public welfare. Current RERP evaluation procedures are qualitative in nature and while they do compare emergency drill performance with the RERP, the nature of the drills often does not provide enough realism to actual emergency conditions. Automated simulation of real emergency conditions using modern computer equipment and programming techniques could provide the NRC emergency evaluation teams a simulated environment which closely approximates conditions which would actually exist during a real emergency. The computer can be used to collect and log performance and event data which will aid the evaluation team in making assessments of the State or local area's EPP and their Emergency Preparedness Teams performance during emergency drills. Overall, a computerized EPSF could improve drill testing and evaluation efficency, provide approximate emergency condition realism, and improve public awareness of local emergency procedures.

NUREG/CR-0995 PC **A04**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Feasibility of Monitoring the Strength of HTGR Core Support Graphite. Part II,
W. C. Morgan, and F. L. Becker. Nov 79, 53p
PNL-3126
Contract DOE-EY-76-C-06-1830

The results reported herein establish the technical feasibility of a method for monitoring the strength of HTGR core support structures in situ. Correlations have been established between the velocity of an ultrasonic pulse and the compressive strength of four different grades of graphite. For some grades of graphite, one or more of the correlations are practically independent of oxidation profile in samples having cylindrical geometry (as in the core support posts). For other grades of graphite, and for other sample geometries, the oxidation-depth profile must be known in order to reliably predict the effect of oxidation on compressive strength.

NUREG/CR-1058 PC **A04**/MF **A01**
Los Alamos Scientific Lab., NM.
Impact of SIMMER-II Model Uncertainties on Predicted Postdisassembly Dynamics.
Informal rept.,
C. R. Bell, R. D. Burns, III, and L. B. Luck. Nov 79, 65p LA-8053-MS
Contract W-7405-eng-36

The SIMMER-II calculation of the system kinetic energy developed during a voided core postdisassembly expansion in a hypothetical loss of flow accident sequence gives results which are more than an order of magnitude below that for an ideal expansion. This work attempts to determine the extent to which uncertainties in the various phenomenological models in SIMMER-II influence the calculated results. A series of 15 separate SIMMER-II calculations were designed to make this assessment. The system kinetic energies which ranged from 2.5 to 20 MJ compared to 100 MJ for the ideal expansion.

NUREG/CR-1076 PC **A04**/MF **A01**
National Bureau of Standards, Washington, DC. National Measurement Lab.
Development of High-Sensitivity Ultrasonic Techniques for Inservice Inspection of Nuclear Reactors.
Annual rept. Oct 77-Sep 78,
M. Linzer, S. I. Parks, D. R. Dietz, and S. J. Norton. Nov 79, 56p
Contract AT(49-25)9000
See also PB-288 899.

During the period covered by this report, the expanding-aperture annular array system and an analysis of the focusing properties of an annular array were completed. Experiments were also undertaken to test the efficacy of spatial-temporal averaging to improve the signal-to-grain noise ratio in austenitic steel.

NUREG/CR-1092 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Advanced Two-Phase Flow Instrumentation Program Quarterly Progress Report for April-June 1979,
K. G. Turnage, and C. E. Davis. Nov 79, 28p
ORNL/NUREG/TM-357
Contract W-7405-eng-26
See also NUREG-0710.

The objective of the Advanced Two-Phase Flow Instrumentation Program is to improve the accuracy and precision of transient two-phase flow measurements required in reactor safety research. Instrumented piping spool pieces and other two-phase flow measurement devices are being studied. Experiments that were conducted in steam-water two-phase flow with a piping segment instrumented for making flow measurements are described. Results obtained with a triple-beam densitometer, a turbine flowmeter, and a drag flowmeter in the steam-water vertical upflow tests are presented. Comparisons between recorded turbine rotor velocities and velocities predicted by three turbine models are made, and two-phase mass flow models, applied to the recorded data, are compared with the mass flow metered into the steam-water system.

NUREG/CR-1096 PC **A04**/MF **A01**
Argonne National Lab., IL.
Physics of Reactor Safety.
Quarterly rept. Apr-Jun 79,
Nov 79, 68p ANL-79/76
See also NUREG/CR-0864.

This Quarterly progress report summarizes work done during the months of April-June 1979 in Argonne National Laboratory's Applied Physics and Components Technology Divisions for the Division of Reactor Safety Research of the U.S. Nuclear Regulatory Commission. The work in the Applied Physics Division includes reports on reactor-safety research and technical coordination of the RSR safety analysis program by members of the Reactor Safety Appraisals Group, Monte Carlo analysis of safety-related critical assembly experiments by members of the Reactor Computations Group, and planning of safety-related critical experiments by members of the Zero Power Reactor Planning and Experiments Group. Work on reactor core thermal-hydraulics was performed in ANL's Components Technology Division.

NUREG/CR-1102-V-1 PC **A03**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
A Systematic Assessment of the Safeguards Regulations. Volume I. Summary.
Technical rept. Apr 77-Sep 79,
D. W. Fraley. Nov 79, 37p PNL-2804-VOL-1
Contract DOE-EY-76-C-06-1830
See also Volume 2, NUREG-1102-V-2.

In this study, systematic analysis methods are used to assess the content and relative coverage of present physical protection and material control and accounting regulations. With the promulgation of the reactor physical protection rule (Section 73.55, Chapter 10 of the Code of Federal Regulations), basic safeguards for all facets of the nuclear industry will have been specified. However, no systematic assessment of the regulations as a whole has been made. The objective of this study is to provide a systematic analysis of the safeguards regulations using a structural approach. Specifically, regulatory requirements are examined to determine if they are: responsive to safeguards policy, consistent, complete, and do not contradict or render ineffective other safeguards, public safety, or worker safety requirements. This volume provides a summary of the study report.

NUREG/CR-1102-V-2 PC **A09**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
A Systematic Assessment of the Safeguards Regulations. Volume II. Report.
Technical rept. Apr 77-Sep 79,
D. W. Fraley. Nov 79, 200p PNL-2804-VOL-2
Contract DOE-EY-76-C-06-1830
See also Volume 1, NUREG/CR-1102-V-1, and Volume 3, NUREG/CR-1102-V-3.

The publication presents systematic analysis methods which are used to assess the content and relative coverage of the physical protection and material control and accounting regulations, contained in 10 CFR Parts 50, 70, 71 and 73. Specifically, the regulatory requirements are examined to determine if they are (1) responsive to safeguards policy, (2) consistent, (3) complete, and (4) do not contradict or render ineffective other safeguards requirements, public safety requirements, or worker safety requirements. This volume presents the result of this study.

NUREG/CR-1102-V-3 PC **A09**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
A Systematic Assessment of the Safeguards Regulations. Volume III. Appendices.
Technical rept. Apr 77-Sep 79,
D. W. Fraley. Nov 79, 195p PNL-2804-VOL-3
Contract DOE-EY-76-C-06-1830
See also Volume 2, NUREG/CR-1102-V-2.

The objective of this study was to provide a systematic analysis of nuclear safeguards regulations. This volume contains appendices on organizations for the safeguards regulations, a safeguards index, and a keyword retrieval system.

NUREG/CR-1124 PC **A05**/MF **A01**
Sandia Labs., Albuquerque, NM.
FISGAS - A Code for Fission-Gas Migration and Fuel Swelling in an LMFBR Accident,
R. W. Ostensen. Nov 79, 78p SAND-78-1790

A new computer program, FISGAS, has been written to model the microscopic behavior of fission-gas in uranium dioxide reactor fuel and its effect on the macroscopic swelling of that fuel in a reactor accident. A radial multinode capability is provided. Separate calculations are provided for gas bubble motion and coalescence and gas transfer inside the grain, on the grain face, and on the grain edge. Microscopic modeling of the gas bubbles includes vacancy-flow restriction on the bubble size and macroscopic pressure field restraint on bubble growth. The pressure field is controlled by the fuel swelling rate which is limited by macroscopic creep. FISGAS is primarily designed to provide a diagnostic tool for the Fuel Disruption test series being performed in the Annular Core Research Reactor at Sandia Laboratories.

NUREG/CR-1130 PC **A04**/MF **A01**
Rensselaer Polytechnic Inst., Troy, NY. Dept. of Nuclear Engineering.
Two-Phase Flow Phenomena in Nuclear Reactor Technology.
Quarterly progress rept. no. 11, 1 Dec 78-28 Feb 79,
R. T. Lahey, Jr. Oct 79, 61p
Contract NRC-04-76-301
See also rept. no. 10 dated Mar 79, PB-294 695.

This quarterly progress Report contains a description of the work done in three areas of technology. The significant results are: Two-phase flow instrumentation development - The recent PNA tagging data is presented. In addition, a detailed error analysis is presented for the side-scatter gamma ray system under development; Phase distribution and separation phenomena - An analytical model for phase separation in Wyes and Tees is presented. In addition, an analytical model for subchannel void-drift is developed; and BWR parallel channel effects - The status of the experimental PCE loop and the supporting analysis is presented.

NUREG/CR-1134 PC **A02**/MF **A01**
Mound Facility, Miamisburg, OH.
The Possible Mechanisms for the Formation of the Observed and Expected Compounds during a Hypothetical Core Disruptive Accident (HCDA).
Research rept.,
W. A. Zanotelli, and G. D. Miller. Nov 79, 25p
MLM-2637

Results are presented for an evaluation of the thermodynamics and kinetics of the possible chemical reactions which may occur in an HCDA bubble environment during its transport within, and following, its release from the reactor primary system.

NUREG/CR-1143 PC **A05**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Mechanical Engineering.

Considerations in Small-Scale Modeling of Pool Swell in BWR Containments.
Topical rept. Jun 78-Jul 79,
P. W. Huber, A. A. Sonin, W. G. Anderson, R. P. Burke, and N. G. Ruggieri. Nov 79, 93p

Experiments were conducted in a laboratory scale test system to study limitations to the hydrodynamic scaling laws used in reduced scale simulations of BWR pool swell. Detailed experimental records of pool swell are presented. The importance of the following factors, which are among the actual and postulated causes of mis-scaling in reduced scale experimental tests is discussed: the enthalpy influx during pool swell, boundary flexibility due to small attached air bubbles or true fluid structure interaction, the presence of water vapor in the wetwell airspace and the hydrodynamics of downcomer clearing and bubble breakthrough.

NUREG-0503-SUP-1 PC **A03**/MF **A01**
Nuclear Regulatory Commission, Washington, DC.
U.S. Nuclear Regulatory Commission Fiscal Year 1980 Supplemental Budget Request.
10 Dec 79, 27p
Supplement to PB-293 113.

The proposed supplemental will enable the Nuclear Regulatory Commission to implement necessary additional effort arising from the agency's assessment of the accident at the Three Mile Island Unit 2 facility on March 28, 1979. The TMI accident has had a major impact on all NRC program areas, in particular on research activities and reactor operations. In addition, funds are requested to enhance the agency's Waste Management program to reflect the recommendations of the President's Interagency Review Group on Waste Management. Specific activities involved in this effort will include developing regulatory guidance, developing a licensing review capability and completing a plan for the site characterization review, all in support of the preparation of NRC guidelines necessary to conduct a construction authorization review. FY 1980 appropriations did not include funds to cover these requirements. A detailed analysis across program lines of the supplemental request is contained in this report.

NUREG-0525-REV-1 PC **A07**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Div. of Safeguards.
Safeguards Summary Event List (SSEL),
John J. Davidson. Nov 79, 150p
See also NUREG-0525.

The Safeguards Summary Event List provides data on nine categories of Safeguards-related events involving NRC-licensed material or licensees. It is deliberately broad in scope for two main reasons. First, the list is designed to serve as a reference document. It is as complete and accurate as possible. If additional information is obtained on an event, it will be incorporated into future revisions of the list. Second, the list is intended to provide as broad as perspective of the nature of licensee-related events as possible.

NUREG-0616 PC **A10**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Inspection and Enforcement.
Report of Special Review Group, Office of Inspection and Enforcement on Lessons Learned from Three Mile Island.
Regulatory rept.
Dec 79, 212p

A Special Review Group of Office of Inspection and Enforcement (IE) was commissioned to develop and recommend changes in IE programs based on TMI experience. Both preventive and responsive aspects of IE programs and operations were studied. A total of 219 separate recommendations for change was generated in this review. Preventive changes pervade all parts of the routine IE Inspection Program ranging from plant design through operation. Responsive changes focus on emergency preparedness of licensees and the NRC. In the aggregate, these changes will enhance program and organizational effectiveness of the office. The relative priority of recommended changes and estimation of resources needed to implement them have been left to IE line management.

NUREG-0623 PC **A05**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
Generic Assessment of Delayed Reactor Coolant Pump Trip during Small Break Loss-of-Coolant Accidents in Pressurized Water Reactors.
Technical rept.,
Brian W. Sheron. Nov 79, 79p

Recent analyses by the PWR vendors have indicated that excessive fuel cladding temperatures could result if the reactor coolant pumps remained running or their trip was delayed during a small break Loss-of-Coolant Accident. The review of these analyses and analysis models by the NRC staff have resulted in the conclusion that early, automatic pump trip during a small break LOCA is required in order to prevent excessive fuel cladding temperatures.

NUREG-0632 PC **A04**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
NRC Views and Analysis of the Recommendations of the President's Commission on the Accident at Three Mile Island.
Technical rept.
Nov 79, 53p

This report provides the Nuclear Regulatory Commission's views and analysis of the recommendations of the President's Commission on the accident at Three Mile Island. The Nuclear Regulatory Commission was requested to provide this response by Dr. Frank Press, Director, Office of Science and Technology Policy, Executive Office of the President. The current status of NRC activities in each of the major topical areas of recommendations of the President's Commission is summarized. Supplemental views of individual NRC Commissioners are included.

ORNL/SUB-76250/2 PC **A14**/MF **A01**
Mechanical Technology, Inc., Latham, NY.
Helium Circulators. Phase 2. Performance Test Report.
D. G. Dominy. Apr 79, 315p
Contract W-7405-ENG-26

Data from the performance testing and 100-hour shakedown testing of a prototype helium circulator and electric motor are presented. (ERA citation 04:051483)

SAND-79-0447C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Small Force Engagement Range (SFER) And Its Application to the Gathering of Behavioral Data.
B. D. Link, and H. D. Shapiro. 1979, 10p CONF-790707-14
Contract EY-76-C-04-0789
20. annual meeting of the Institute of Nuclear Materials Management, Albuquerque, NM, USA, 16 Jul 1979.

Although human performance and decision making play a decisive role in determining the outcomes of combat in real life, these factors have been inadequately taken into account in current combat models. A discussion is given of some of these factors and means of improving our knowledge about them using the SFER. Special attention is given to those factors germane to small forces combat and their integration into the Transportation Safeguards Effectiveness Model. (ERA citation 04:049577)

SAND-79-1372C PC **A03**/MF **A01**
Sandia Labs., Albuquerque, NM.
Application of SAFE to an Operating Reactor.
L. D. Chapman. 1979, 26p CONF-790707-18
Contract EY-76-C-04-0789
20. annual meeting of the Institute of Nuclear Materials Management, Albuquerque, NM, USA, 16 Jul 1979.

A method for the evaluation of physical protection systems at nuclear facilities has been developed. The evaluation process consists of five major phases: (1) Facility Characterization, (2) Facility Representation, (3) Component Performance, (4) Adversary Path Analysis, and (5) Effectiveness Evaluation. Each of these phases will be described in some detail and illustrated by examples. The process for evaluation of physical protection system effectiveness against an outside threat will be presented for a reactor facility. (ERA citation 04:050109)

TFBP-TR-238 PC **A04**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
PBF-LOCA Test Series, Test LOC-3: Quick Look Report.
T. R. Yackle, M. E. Waterman, and L. L. McKie.
Jul 79, 66p
Contract EY-76-C-07-1570

The preliminary results are presented of the PBF-LOCA Test LOC-3 performed in the Power Burst Facility test reactor at the Idaho National Engineering Laboratory on June 27, 1979. The test was designed to simulate conditions that could exist during an accident resulting from a double-ended cold leg break in a pressurized water reactor (PWR) core. (ERA citation 04:051711)

TFBP-TR-321 PC **A03**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
Power-Cooling-Mismatch Test PCM-7 Experiment Predictions.
R. H. Smith, and D. T. Sparks. Jun 79, 47p
Contract EY-76-C-07-1570

The Test PCM-7 objective is to study the response of PWR type fuel rods subjected to high temperature film boiling operation in a small cluster geometry. To attain this objective, extensive calculations to evaluate the test design and conduct were performed. Some of the analysis were conducted for Test PCM-5 and due to the similarities between Tests PCM-5 and PCM-7, were not repeated. Other calculations were conducted on the basis of posttest results obtained from Test PCM-5 to help evaluate the complex interdependence of the local thermal-hydraulic conditions within the cluster. The computer code calculations and the application of the results are summarized. (ERA citation 04:050110)

UCRL-13928 PC **A09**/MF **A01**
Woodward-Clyde Consultants, San Francisco, CA.
Methodology for Characterizing Potential Adversaries of Nuclear Material Safeguards Systems.
C. W. Kirkwood, and S. M. Pollock. Nov 78, 176p
Contract W-7405-ENG-48

The results are described of a study by Woodward--Clyde Consultants to assist the University of California Lawrence Livermore Laboratory in the development of methods to analyze and evaluate Nuclear Material Safeguards (NMS) Systems. The study concentrated on developing a methodology to assist experts in describing, in quantitative form, their judgments about the characteristics of potential adversaries of NMS Systems. (ERA citation 04:029482)

UCRL-15052(V.1) PC **A06**/MF **A01**
Agbabian Associates, El Segundo, CA.
Verifying Seismic Design of Nuclear Reactors by Testing. Volume 1: Test Plan.
20 Jul 79, 110p
Contract W-7405-ENG-48

This document sets forth recommendations for a verification program to test the ability of operational nuclear power plants to achieve safe shutdown immediately following a safe-shutdown earthquake. The purpose of the study is to develop a program plan to provide assurance by physical demonstration that nuclear power plants are earthquake resistant and to allow nuclear power plant operators to (1) decide whether tests should be conducted on their facilities, (2) specify the tests that should be performed, and (3) estimate the cost of the effort to complete the recommended test program. (ERA citation 04:050113)

UCRL-15052(V.2) PC **A04**/MF **A01**
Agbabian Associates, El Segundo, CA.
Verifying Seismic Design of Nuclear Reactors by Testing. Volume 2: Appendix, Theoretical Discussions.
29 Jul 79, 58p
Contract W-7405-ENG-48

Theoretical discussions on seismic design testing are presented under the following appendix head-

ings: system functions, pulse optimization program, system identification, and motion response calculations from inertance measurements of a nuclear power plant. (ERA citation 04:050114)

UCRL-82335 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
TASTEX Gamma Spectrometer System for Measuring Isotopic and Total Plutonium Concentrations in Solutions.
R. Gunnink, A. L. Prindle, J. B. Niday, A. L. Van Lehn, and Y. Asakura. 18 Jun 79, 11p CONF-790707-10
Contract W-7405-ENG-48
20. annual meeting of the Institute of Nuclear Materials Management, Albuquerque, NM, USA, 16 Jul 1979.

Described is a computer-based gamma ray spectrometer system using a germanium detector for rapid nondestructive measurement of isotopic and total plutonium concentrations in solutions at nuclear reprocessing plants. Isotopic concentrations have been measured with an accuracy of +-0.5%. Cell design, calibration techniques, and preliminary results are discussed. This system is being installed at the Tokai reprocessing plant in Japan. (ERA citation 04:048247)

UNI-M-90(V.3) PC **A99**/MF **A01**
United Nuclear Industries, Inc., Richland, WA.
N Reactor Updated Safety Analysis Report, NUSAR.
28 Feb 78, 610p
Contract EY-76-C-06-1857

An update of the safety analysis of the N Reactor is presented concerning the reactor and the coolant systems. The fuel system; nuclear, thermal, and hydraulic designs; reactor materials; and the reactivity control system are examined. The integrity of the coolant boundary, pressure tubes, coolant system components, graphite and shield cooling, horizontal control rod cooling, and the bottom insulation layer cooling are described. (ERA citation 04:023175)

WAPD-TM-1148 PC **A04**/MF **A01**
Bettis Atomic Power Lab., West Mifflin, PA.
Fission-Product Iodine in Thoria/Urania Oxides (LWBR Development Program).
J. C. Clayton. Feb 79, 51p
Contract EY-76-C-11-0014

The ThO sub 2 fuel from an undefected irradiation test rod depleted to approx. 5 x 10 exp 20 fissions/cm exp 3 was leached - first with methyl chloroform to extract any free fission iodine, followed by a second extraction with water to collect chemically-combined iodine ions. Equivalent amounts of exp 129 I were found in each leaching solution. Combined and free iodine (exp 131 I) were also measured in extractions from lightly irradiated ThO sub 2 --UO sub 2 and UO sub 2 powders. The major portion of the identified combined exp 131 I activity was in the form of iodide (exp 131 I exp -), but both iodate (exp 131 IO sub 3-) and periodate (exp 131 IO sub 4-) were also detected. Most of the intentionally-introduced iodine was retained by unirradiated ThO sub 2 powders on vacuum annealing up to 700 exp 0 C and released at 1000 exp 0 C. The experimental results were correlated with available data on radioiodine release from irradiated ThO sub 2 and UO sub 2 . (ERA citation 04:050009)

WAPD-TM-1371 PC **A08**/MF **A01**
Bettis Atomic Power Lab., West Mifflin, PA.
Fuel Utilization Potential in Light Water Reactors with Once-Through Fuel Irradiation (AWBA Development Program).
D. S. Rampolla, G. H. Conley, N. R. Candelore, G. K. Cowell, and G. P. Estes. Jul 79, 162p
Contract EY-76-C-11-0014

Current commercial light water reactor cores operate without recylce of fuel, on a once-through fuel cycle. To help conserve the limited nuclear fuel resources, there is interest in increasing the energy yield and, hence, fuel utilization from once-through fuel irradiation. This report evaluates the potential increase in fuel utilization of light water reactor cores operating on a once-through cycle assuming 0.2% enrichment plant tails assay. This evaluation is based on a large number of survey calculations using techniques which were verified by more detailed calculations of several core concepts. It is concluded that the maximum fuel utilization which could be achieved by practical once-through pressurized light water reactor cores with either uranium or thorium is about 17 MWYth/ST U sub 3 O sub 8 (Megawatt Years Thermal per Short Ton of U sub 3 O sub 8). This is about 50% higher than that of current commercial light water reactor cores. Achievement of this increased fuel utilization would require average fuel burnup beyond 50,000 MWD/MT and incorporation of the following design features to reduce parasitic losses of neutrons: reflector blankets to utilize neutrons that would otherwise leak out of the core; fuel management practices in which a smaller fraction of the core is replaced at each refueling; and neutron economic reactivity control, such as movable fuel control rather than soluble boron control. For a hypothetical situation in which all neutron leakage and parasitic losses are eliminated and fuel depletion is not limited by design considerations, a maximum fuel utilization of about 20 MWYth/ST U sub 3 O sub 8 is calculated for either uranium or thorium. It is concluded that fuel utilization for comparable reactor designs is better with uranium fuel than with thorium fuel for average fuel depletions of 30,000 to 35,000 MWD/MT which are characteristic of present light water reactor cores. (ERA citation 04:051459)

WAPD-TM-1449 PC **A07**/MF **A01**
Bettis Atomic Power Lab., West Mifflin, PA.
Integral Testing of Thorium and U233 Data for Thermal Reactors (AWBA Development Program).
J. Hardy, Jr., J. J. Ullo, and N. M. Steen. Jun 79, 133p
Contract EY-76-C-11-0014

A survey is made of integral experiments useful for testing thorium and exp 233 U nuclear data in thermal reactor applications. Emphasis is on homogeneous exp 233 U--H sub 2 O criticals and simple, water-moderated exp 233 U--thorium and exp 235 U--thorium lattice experiments. Thorium-- exp 233 U-graphite experiments are also discussed briefly. Although the available experiments provide a fairly consistent test of important nuclear data, their accuracy and scope leave much to be desired. In detailed Monte Carlo analyses, ENDF/B-IV data are found to perform reasonably well. Adequate (though partly fortuitous) agreement is found with integral measurements of thorium resonance capture in lattices. A new, harder fission spectrum for exp 233 U can correct the principal discrepancy observed with ENDF/B-IV, a bias trend in K/sub eff/ attributed to an underprediction of leakage. (ERA citation 04:049936)

Y/DG-10-746 PC **A02**/MF **A01**
Oak Ridge Y-12 Plant, TN.
Progress Report on Installing DYMCAS in the Oak Ridge Y-12 Plant.
W. T. Mee. 1979, 8p CONF-790707-1
Contract W-7405-ENG-26
20. annual meeting of the Institute of Nuclear Materials Management, Albuquerque, NM, USA, 16 Jul 1979.

A material control and accountability system to assist in detecting diversion of special nuclear materials (SNM) was being considered by the management of the Oak Ridge Y-12 Plant in early 1975. The Dynamic Special Nuclear Materials Control and Accountability System (DYMCAS) is the product of these considerations. The evolution of computerized accountability systems for near real-time accounting of SNM will revolutionize the activities for operations and accountability departments in Y-12. The advancement of nondestructive analysis equipment with a capability for real-time input of accounting data is becoming a reality. The progress of installing the DYMCAS in a large plant processing unirradiated enriched uranium is described. (ERA citation 04:051188)

18J. Reactor Materials

AED-Conf-78-274-010 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation Eggenstein-Leopoldshafen (Germany, F.R.).
Problems and Results of Uranium Enrichment from Seawater.
K. Schwochau. 1978, 5p CONF-7810177-12
In German.Lecture meeting on principles and applications of nuclear-, radio-, and radiation chemistry, Lindau, F.R. Germany, 16 Oct 1978.
U.S. Sales Only.

According to the present state of knowledge, merely the application of solid adsorbers can be considered for uranium enrichment from seawater. The extraction of one ton of uranium presumes that the absorber will be contacted with about 10 exp 9 m exp 3 seawater. Large quantities of adsorber must be available even with high enrichment factors which must exhibit selectivity, be able to be regenerated and possess long-term resistance in seawater and elution solution. We have tested various biological, mineral, synthetic inorganic and organic adsorbers for their maximum uranium charge in natural seawater, however it was shown that for the greatest part the uranium adsorption was insufficient. It can be assured from the results sofar that preferably uranyl ions and not tricarbonate - uranylate anions are bonded. In exchange resins justified the technical boundary conditions of a suitable adsorber if one is able to increase their selectivity and capacity for uranium through particular functional groups. By systematic criteria, it was capable of suppressing the carbonate ligands in (UO sub 2 (CO sub 3) sub 3) exp 4- . The uranium enrichments recently obtained with an ion exchanger resin in natural seawater are encouraging. (Atomindex citation 10:458518)

ANL-Trans-1169 PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Continuous Measurements of the Redistribution of Oxygen in UO/sub 2+X/ in a Thermal Gradient.
R. Ducroux, M. Fromont, and A. Pattoret. Jun 79, 21p CONF-790111-6(Trans)
C IAEA-SM--236/89.International symposium on thermodynamics of nuclear materials, Julich, F.R. Germany, 29 Jan 1979.

An out-of-pile investigation of the redistribution of oxygen in UO/sub 2+x/ to allow a subsequent explanation of the O/U + Pu profiles obtained after quenching in the irradiated fuel was made. The thermal gradients were obtained with an imaging furnace. The focal spot of a surface of 0.5 cm exp 2 was adjusted to the top of the cylindrical oxide specimen; the cold part was in contact with a Mo furnace, making it possible to maintain a solid-electrolyte miniprobe (ThO sub 2 --Y sub 2 O sub 3) containing a Fe/FeO chemical standard under isothermal conditions. The miniprobe gave the O activity in the cold zone of the specimens at all times. It was tested by measuring the O potentials of different chemical systems. The experiments were conducted in an atmosphere of Ar purified by electrochemical pumps. The UO/sub 2+x/ specimens were subjected to a moderate thermal gradient of about 300 exp 0 C/cm to limit evaporation phenomena to the hot zone. After continuous observation of the emf, the specimens were sharply quenched and then cut into sections; the O/U ratio of each section was analyzed. The oxygen follows the thermal gradient significantly even though the annealing time was relatively short and the temperatures were low. Comparison of the results obtained in UO/sub 2+x/ with a computer calculation performed on the basis of solid-phase thermal diffusion for oxygen showed very reasonable agreement. (ERA citation 04:050348)

BARC-925 PC **A02**/MF **A01**
Bhabha Atomic Research Centre, Bombay (India).
Specification Analysis of Plutonium Fuels : A Potentiometric Method for the Determination of Plutonium.
S. Vaidyanathan, and P. R. Natarajan. 1977, 13p
U.S. Sales Only.

A potentiometric method for the routine determination of plutonium in the specification analysis of plutonium fuels is described. Plutonium is oxidized to Pu(VI) with AgO and Pu(VI) is reduced with Fe(II) after the destruction of excess AgO with sulphamic acid. The excess Fe(II) is titrated potentiometrically against K sub 2 Cr sub 2 O sub 7 , the titration being carried out by adding a concentrated titrant solution from a weight burette and a suitably dilut-

ed solution from another weight burette near the end. The overall relative standard deviation obtained in 326 analyses of a working standard solution by eight experimenters is 0.14 percent. (Atomindex citation 10:447783)

BARC-933 PC **A02**/MF **A01**
Bhabha Atomic Research Centre, Bombay (India).
Separation of Tributyl Phosphate from Degraded Solvents.
S. V. Kumar, M. N. Nadkarni, A. Ramanujam, M. Venkatesan, and V. Gopalakrishnan. 1977, 16p
U.S. Sales Only.

A solvent extraction method is described for the recovery of tributyl phosphate (TBP) from degraded process solvents. The method involves the separation of TBP and shell solT(SST) from 30% TBP/SSP mixture by thorium nitrate extraction leading to the formation of a heavy phase (third phase) which contains essentially TBP. The equilibrium experiments revealed that by utilizing thorium feeds of concentrations above 525 g/L in water at 1:1 ratio, a 30% TBP/SST mixture can be effectively separated into TBP and SST fractions with light SST phase having about 3% TBP. Using single stage mixer settler experiments, the feasibility of continuous separation of the three phases was assessed. Since there is a tendency for the degraded products of the diluent to seek the TBP phase, additional treatment steps would be necessary for their removal if the TBP is to be reused. Activated charcoal was investigated for this purpose. If purification of the TBP is not envisaged the volume of the organic waste generated in processing plants could be reduced by separating the diluent and TBP and only the TBP could be sent as concentrated waste. (Atomindex citation 10:447858)

CONF-790841-1 PC **A02**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
Automated Welding of Nuclear Piping Systems.
D. W. Hood. 1979, 5p
Contract EY-76-C-07-1570
AWS maintenance welding in nuclear power plants conference, Atlanta, GA, USA, 6 Aug 1979.

Automated welding, or more broadly, automatic and mechanized welding processes, has found a role in nuclear power plant fabrication. This role has expanded from a rare or isolated application to relatively frequent usage in the last five years. More importantly, it is envisioned that use of automated welding will be increasing at an accelerated rate as broader exposure to this technology is achieved. Among the various pipe welding processes, the only one which has been developed for mechanized and automated nuclear piping welding is the gas tungsten arc welding (GTAW) process. This development has occurred in the past 10 to 15 years through the steady improvement and commmercialization of orbiting welding heads. Improvements in GTAW power supplies, control systems, etc., have aided this commercialization but the main element and pacing item has been the welding head itself. In order to review the status of mechanized and automated nuclear pipe welding, the topics of basic process equipment, joint design, fit-up requirements, welding parameters, and producibility will be addressed. In addition, anticipated future developments in automated systems will be discussed. (ERA citation 04:051554)

COO-2712-6 PC **A02**/MF **A01**
Pennsylvania State Univ., University Park.
Studies of Mechanical Properties and Irradiation Damage Nucleation of HTGR Graphites. Progress Report, February 1, 1978--March 31, 1979.
P. A. Thrower. Apr 79, 18p
Contract EY-76-S-02-2712

Irradiation damage effects to highly oriented pyrolytic graphite by 1.5, 5.5 and 15 MeV neutrons are briefly described. Studies of the effects of oxidation on the structure and strength of Stackpole 2020, Great Lakes H440 and POCO AXF-5Q graphites have been continued using H sub 2 O vapor as the oxidant. The effect of burn-off on compressive strength is similar to that of CO sub 2 , but structural effects are quite different. The kinetics of the C--CO sub 2 reaction are being studied using low CO sub 2 partial pressures in a total pressure of one atmosphere. The necessary modifications to existing apparatus have been made and experimental work is commencing. (ERA citation 04:051472)

COO-2975-31 PC **A03**/MF **A01**
General Electric Co., Schenectady, NY. Energy Systems Programs Dept.
Advanced Gas Cooled Nuclear Reactor Materials Evaluation and Development Program. Progress Report, January 1, 1979-March 31, 1979.
19 Jul 79, 32p
Contract EY-76-C-02-2975

This report presents the results of work performed from January 1, 1979 through March 31, 1979 on the Advanced Gas Cooled Nuclear Reactor Materials Evaluation and Development Program. The objectives of this program are to evaluate candidate alloys for Very High Temperature Reactor (VHTR) Nuclear Process Heat (NPH) and Direct Cycle Helium Turbine (DCHT) applications, in terms of the effect of simulated reactor primary coolant (helium containing small amounts of various other gases), high temperatures, and long time exposures, on the mechanical properties and structural and surface stability of selected candidate alloys. Work covered in this report includes the activities associated with the creep-rupture testing of the test materials for the purpose of verifying the stresses selected for the screening creep test program, and the status of the simulated reactor helium supply system, testing equipment, and gas chemistry analysis instrumentation and equipment. (ERA citation 04:054670)

DPST-78-126-11/12 PC **A03**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Exp 238 Pu Fuel Form Processes. Bimonthly Report, November/December 1978.
1978, 27p
Contract EY-76-C-09-0001

The report is one of a series to summarize progress in the Savannah River Laboratory exp 238 Pu Fuel Form Program. This program is supported by the DOE Division of Advanced Nuclear Systems and Projects (DANSP). Goals of the Savannah River Laboratory (SRL) program are to provide technical support for the transfer of DANSP exp 238 Pu fuel form fabrication operations from Mound Laboratory to new facilities at the Savannah River Plant (SRP), to provide the technical basis for exp 238 Pu scrap recovery at SRP, and to assist in sustaining plant operations. (ERA citation 04:052725)

GA-A-15349 PC **A03**/MF **A01**
General Atomic Co., San Diego, CA.
Factors Affecting the Performances of Sprayed Chromium Carbide Coatings for Gas-Cooled Reactor Heat Exchangers.
G. Y. Lai. Mar 79, 35p CONF-790442-18
Contracts EY-76-C-03-0167-050, EY-76-C-03-0167-065
International conference on metallurgical coatings, San Diego, CA, USA, 23 Apr 1979.

The paper discusses some important factors to be considered for using sprayed coatings in gas-cooled reactor heat exchangers. These factors include (a) high-temperature gaseous corrosion, (b) thermal stability of coatings, (c) metallurgical compatibility between the coating and substrate, and (d) effects of the coating on the mechanical properties of the substrate alloy. The coatings evaluated were Cr sub 3 C sub 2 --NiCr and Cr sub 23 C sub 6 --NiCr applied by either plasma-arc or detonation-gun process. (ERA citation 04:051478)

GA-A-15452 PC **A03**/MF **A01**
General Atomic Co., San Diego, CA.
Consolidated Fuel Recycle Program. Annular Pulse Column Development Studies Interim Development Report.
G. E. Benedict. Jul 79, 29p
Contract EY-76-C-03-0167-053

The capacity of critically safe cylindrical pulse columns limits the size of nuclear fuel solvent extraction plants because of the limited cross-sectional area of plutonium, U-235, or U-233 processing columns. Thus, there is a need to increase the cross-sectional area of these columns. This can be accomplished through the use of a column having an annular cross section. The preliminary testing of a pilot-plant-scale annular column has been completed and is reported. The column is made from 152.4-mm (6-in.) glass pipe sections with an 89-mm (3.5-in.) OD internal tube, giving an annular width of 32 mm (1.25 in.). Louver plates are used to swirl the column contents to prevent channeling of the phases. The data from this testing indicate that this approach can successfully provide larger-cross-section critically safe pulse columns. While the capacity is only 70% of that of a cylindrical column of similar cross section, the efficiency is almost identical to that of a cylindrical column. No evidence was seen of any nonuniform pulsing action from one side of the column to the other. 6 figures, 5 tables. (ERA citation 04:054205)

HEDL-SA-1763-FP PC **A03**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Oxygen-to-Metal Ratio Control During Fabrication of Mixed Oxide Fast Breeder Reactor Fuel Pellets.
D. E. Rasmussen, M. W. Benecke, W. R. Jentzen, and R. B. McCord. May 79, 32p CONF-790602-77
Contract EY-76-C-14-2170
ANS annual meeting, Atlanta, GA, USA, 3 Jun 1979.

Oxygen-to-metal ratio (O/M) of mixed oxide fuel pellets can be controlled during fabrication by proper selection of binder (type and content) and sintering conditions. Sintering condition adjustments involved the passing of Ar--8% H sub 2 sintering gas across a cryostat ice bath controlled to temperatures ranging from -5 to -60 exp 0 C to control as-sintered pellet O/M ratio. As-sintered fuel pellet O/M decreased with increasing Sterotex binder and PuO sub 2 concentrations, increasing sintering temperature, and decreasing sintering gas dew point. Approximate relationships between Sterotex binder level and O/M were established for PuO sub 2 --UO sub 2 and PuO sub 2 --ThO sub 2 fuels. O/M was relatively insensitive to Carbowax binder concentration. Several methods of increasing O/M using post-sintering pellet heat treatments were demonstrated, with the most reliable being a two-step process of first raising the O/M to 2.00 (stoichiometric) at 650 exp 0 C in Ar--8% H sub 2 bubbled through H sub 2 O, followed by hydrogen reduction to specification O/M in oxygen-gettered Ar-(% H sub 2 at temperatures ranging from 1200 to 1690 exp 0 C. (ERA citation 04:051153)

HEDL-SA-1771 PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Design Analysis of Liquid Metal Pipe Supports.
L. L. Margolin, and F. R. LaSalle. Feb 79, 15p CONF-790615-19
Contract EY-76-C-14-2170
US national congress on pressure vessels and piping, San Francisco, CA, USA, 25 Jun 1979.

Design guidelines pertinent to liquid metal pipe supports are presented. The numerous complex conditions affecting the support stiffness and strength are addressed in detail. Topics covered include modeling of supports for natural frequency and stiffness calculations, support hardware components, formulas for deflection due to torsion, plate bending, and out-of-plane flexibility. A sample analysis and a discussion on stress analysis of supports are included. Also presented are recommendations for design improvements for increasing the stiffness of pipe supports and which were utilized in the FFTF system. (ERA citation 04:051509)

HEDL-SA-1846 PC **A03**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
FFTF Materials of Construction and Surveillance Plans.
F. R. Shober. 4 May 79, 35p
Contract EY-76-C-14-2170
Portions of document are illegible.

No abstract available.

HEDL-TME-79-16 PC **A03**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Glovebox Glove Deterioration in the Hanford Engineering Development Laboratory Fuel Fabrication Facility.
W. O. Greenhalgh, R. C. Smith, and D. L. Powell. Jul 79, 44p
Contract EY-76-C-14-2170

Neoprene glovebox gloves have been found susceptible to periodic rapid deterioration under normal operating conditions in fuel fabrication facilities. Examinations of glove failure histories and measurements of the atmospheres in inert atmosphere dry-boxes indicated ozone at low concentrations of 100 to 500 ppB was probably the most important factor in rapid glove deterioration. Testing of a varity of new glove materials indicated that Hypalon and ethylene-propylene-diamine monomer (EDPM) gloves have greater than 30 times the longevity of neoprene in low-level ozone concentration atmospheres. comparative tests over a 30-month period have also confirmed that the two glove candidates have a significantly longer operative life. 14 figures. (ERA citation 04:054196)

HEDL-6585 PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Electrical Connectors for Nuclear Service: Test Program Results.
J. L. Stringer, and E. M. Sheen. Jun 79, 20p
Contract EY-76-C-14-2170

Two types of electrical connectors, designed and fabricated at PNL, were tested by HEDL under conditions simulating severe external environments of the intended test reactor service. One connector was designed to connect 3 to 4 stainless sheathed two conductor cables in a PWR environment (650 exp 0 F, 2500 psig). The second connector was designed to connect several (10 to 20) metal sheathed cables outside the PWR environment to a flexible cable. The testing performed on the connector was designed to allow determining the amounts of interfering signal added to the sensor circuit by the addition of a connector. These tests included ac coupling into dc circuits, ac coupling with other ac circuits and dc coupling into other dc circuits. These tests were carried out both at room ambient and at 650 exp 0 F in the laboratory and autoclave for the high pressure, high temperature connector and only in the laboratory for the low pressure/temperature connectors. The results of these test are described. (ERA citation 04:051452)

INIS-mf-4912 PC **A06**/MF **A01**
Technische Hochschule Aachen (Germany, F.R.). Fakultaet fuer Maschinenwesen.
Calculation of the Specimen Influence Functions for Fissionable, Absorbing, Moderating, and Scattering Materials for the Reactor 'ADIBKA 1'. Comparison with the Specimen Influence Functions of These Materials Experimentally Determined in 'ADIBKA 1'.
H. Daoud. 12 Jul 76, 114p
In German.Diss.(D.Eng.).
U.S. Sales Only.

If a specimen to be measured is brought into a reactor there is caused a reactivity perturbation called specimen influence function (SIF). The SIF of a specimen depends on the neutron-physical properties and the geometrical dimensions of the specimen on one hand and the reactor on the other. It for a given reactor the SIFs of fissionable material, neutron absorber, scattering material, and moderator are linearly independent from each other, which in general is the case, the composition of the specimen with respect to fissionable, absorbing, scattering, and moderating material may by determined by measuring the reactivity perturbations of a specimen at different locations in the reactor for which the SIFs are known. In this paper the SIFs of a 1g exp 235 U specimen as fissionable material, a 6.33g Cu specimen as neutron absorber, and a 180g graphite specimen as neutron scattering and absorbing material are calculated for the empty central channel of the measuring reactor 'ADIBKA 1'. (Atomindex citation 10:452660)

INIS-mf-4974 PC **A16**/MF **A01**
Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow.
Reactor Material Science. Vol. 5.
1978, 364p CONF-7805178-P4
Conference on reactor materials science, Alushta, Ukrainian SSR, 29 May 1978.
U.S. Sales Only.

Separate abstracts have been prepared for items within the scope of the energy data base. (Atomindex citation 10:458542)

Juel-1536 PC **A03**/MF **A01**
Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Chemische Technologie.
Composition of Recycled (Th, U)O sub 2 Fuel Elements with Medium U Enrichment and Their Effects on the Fuel Cycle.
C. L. da Silveira Branquinho, and U. Wenzel. Sep 78, 34p
In German.
U.S. Sales Only.

The MEU-HTR fuel element is proposed in order to use lower enriched U and to preserve the potential of the HTR as converter and as process heat source. If the final storage of nuclear fuel is not licensed in the Federal Republic of Germany, a complete fuel cycle must be available for the spent nuclear fuel management of this type of fuel. Therefore, the composition of spent mixed oxide MEU-HTR fuel was calculated in this study, considering various recycling strategies. The following conclusions may be drawn from the resulting data. Pu should be included into the recycling with respect to its great breeding rate. - The fresh fuel supply will increase the exp 238 U content of the recycled fuel by decreasing simultaneously the fissile material portion; thus the MEU-fuel will be changed into a LEU-fuel, not well appropriated for HTR's, if the remaining fissile material is not enriched intermediately. - The exp 232 U-production is diminished by recycling Th and decreasing the exp 230 Th-concentration in natural Th. Thus, the technical implementation of the processes of the fuel cycle closure can be facilitated. - New processes have to be developed for reprocessing and refabrication of the MEU fuel. The joint recycling of Th and Pu is proposed. - No state-of-art technology is present for the enrichment of the remaining fissile material. A considerable reasearch and development work has to be done to close the MEU-HTR fuel cycle. (Atomindex citation 10:449611)

NUREG-0621 PC **A04**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Div. of Fuel Cycle and Material Safety.
The Effects of Natural Phenomena on the Westinghouse Electric Corporation Plutonium Fuels Development Laboratory at Cheswick, Pennsylvania. Docket No. 70-1143.
Safety analysis rept.
Nov 79, 58p

An analysis of the effects of natural phenomena on the Westinghouse Electric Corporation Plutonium Development Laboratory at Cheswick, Pennsylvania, has been prepared by the Office of Nuclear Material Safety and Safeguards. The analysis is in support of the Special Nuclear Materials License held by the subject company. It addresses the probable effects of damage to the Westinghouse Electric Corporation Plutonium Development Laboratory by severe weather and earthquake and expresses the consequence of damage as dose to several human receptors. The doses that result from facility damage are multiplied by the occurrence rate for the initiating event yielding the yearly risk.

RFP-2928 PC **A03**/MF **A01**
Atomics International Div., Golden, CO. Rocky Flats Plant.
Process Technology Associated with Pyrochemical Reprocessing.
C. E. Baldwin, and K. M. Myles. 1979, 41p
CONF-790602-45
Contract EY-76-C-04-3533
ANS annual meeting, Atlanta, GA, USA, 3 Jun 1979, Portions of document are illegible.

The process technology of the following three representative processes in pyrochemical reprocessing are examined in detail: melt refining, zinc distillation, and salt transport. (ERA citation 04:048185)

RHO-SA-112 PC **A02**/MF **A01**
Atomics International Div., Richland, WA. Rockwell Hanford Operations.
Determination of a Cold Substitute for Plutonium Nitrate (Pu(NO Sub 3) sub 4) Calcination.
J. T. D'Ambrosia. 6 Apr 79, 17p CONF-790666-2
Contract EY-77-C-06-1030
34. Northwest regional meeting of the American Chemical Society, Richland, WA, USA, 13 Jun 1979.

This activity researched candidate cold substitutes for Pu(NO sub 3) sub 4 needed to test prototype screw calciners for PuO sub 2 production. Cerous nitrate, (Ce(NO sub 3) sub 3 .6H sub 2 O), was identified as the most promising substitute. Four compounds (thorium nitrate, Th(NO sub 3) sub 4 .4H sub 2 O, aluminum nitrate, Al(NO sub 3) sub 3 .9H sub 2 O, ferric nitrate Fe(NO sub 3) sub 3 .9H sub 2 O), and cerous nitrate, Ce(NO sub 3) sub 3 .6H sub 2 O and Al(NO sub 3) sub 3 .9H sub 2 O were found to have the desired physical decomposition properties. Thermal Gravimetric Analysis (TGA) and Differential Thermal Analysis (DTA) of Ce(NO sub 3) sub 3 .6H sub 2 O confirmed its thermal decomposition approximated that of Pu(NO sub 3) sub 4 . 6 figures. (ERA citation 04:049538)

UNI-1270-W/DEL PC **A03**/MF **A01**
United Nuclear Industries, Inc., Richland, WA.
Grafoil Applications on-Plant.
M. Pociluyko. 1 Mar 79, 31p
Contract EY-76-C-06-1857
Portions of document are illegible.

Presented in this report are the quantitative and qualitative aspects of the more than 5,800 applications of Grafoil on-plant. The subject all-graphite product was originally made by the Union Carbide Corporation. Its utilization in the forms of valve packing, gasketing and sealant tapes for leak repair and prevention on-plant since March 1970 is marked with typical zero-leak results. For all practical purposes, the successful results with Grafoil implementation indicate an unqualified control of leakage problems that began in 1967 with the V-11 and V-12 valves in the primary system of N Reactor. Meaningfully, the accruals of savings with existing and future applications shall continue to be incalculable in personnel exposure, maintenance, and capital. Inherent in the savings are the devised methodology and innovative developments coordinately employed in resolving the leak repair problems. (ERA citation 04:051655)

WAPD-TM-1368 PC **A03**/MF **A01**
Bettis Atomic Power Lab., West Mifflin, PA.
Nondestructive Assay of UO sub 2 --ThO sub 2 Fuel Pellets Using the Delayed Neutron Pellet Assay Gage (LWBR Development Program).
C. J. Emert, S. Milani, and W. J. Beggs. Jun 79, 45p
Contract EY-76-C-11-0014

This report describes the use of a delayed neutron pellet assay gage to determine nondestructively the fissile content of fuel pellets during the manufacture of the Light Water Breeder Reactor (LWBR) core. The gage characteristics are described including the nature of the calibration curves and the gage sensitivities to pellet parameters. Statistical methods are derived for analyzing the data to obtain the mean weight percent of total uranium in each blend of fuel material as well as the loading precision of each fuel rod. The fissile loading of each fuel rod was determined to better than 0.25% at the 2 sigma level, and the fissile content of eight fuel compositions in the LWBR core was obtained to better than 0.1%. Use of this gage and the data analysis methods described in this report reduced the need for destructive chemical analysis of fuel pellets by a factor of two. (ERA citation 04:049934)

WCAP-9278 PC **A06**/MF **A01**
Westinghouse Electric Corp., Pittsburgh, PA. Nuclear Fuel Div.
Summary Report of Phase I Residual Holdup Measurements for a Mixed Oxide Fuel Fabrication Facility.
H. C. Woodsum. Mar 78, 120p
Contract EN-77-C-06-1058-001

Metal surface-powder adherence tests showed that the average mean values for direct impinge-

ment was 60 to 80 g/ft exp 2 , whereas the average mean values of the colloidal samples were 0.2 to 2.5 g/ft exp 2 . Thus, it is advantageous to design powder processing equipment to reduce direct impingement wherever possible. Holdup of powder appears to be relatively independent of the surface material or finish, and it is reduced significantly by low-frequency vibration of the surface. Under colloidal conditions, ThO sub 2 produces more residual material than UO sub 2 and is preferentially deposited from a UO sub 2 --ThO sub 2 blend. Pure ThO sub 2 and high enrichment blends of ThO sub 2 in UO sub 2 are expected to produce a significant, persistent electrostatic charge, thus increasing residual holdup. Residual holdup in the clean scrap recovery system (CSRS) could be reduced by 25%. Comparison of CSRS holdup and powder adherence-metal surface data indicated that the areal density of residual material (40 g/ft exp 2) was considerably higher than for colloidal suspension (<2.5 g/ft exp 2). Steady-state residual holdup factor for sintered-metal filters was 13 g/ft exp 2 of filter surface area under optimum conditions. During the pellet grinding tests, residual material built up in the system at rate of about 100 g/h to an estimated limit of 1.4 kg, primarily within the particle collector shroud. During dry grinding, 97% of this residue was contained within the shroud, and during wet grinding only 50% was contained in the shroud owing to inertial effects of the rotating wheel and water coolant. (ERA citation 04:038235)

18K. Reactor Physics

ANL-Trans-1172 PC **A02**/MF **A01**
Homogenization Method Used for Neutron Calculations in Fast Reactors.
Y. H. Bouget, P. Hammer, and F. Lyon. Jun 79, 24p
Contract W-31-109-ENG-38
C Paper presented at the IAEA/NEACRP sponsored conference on Homogenization Methods in Reactors Physics, November 13--15, 1978, at Lugano, Switzerland.

The multiplying lattices which constitute the cores of fast power reactors do not exhibit a significant heterogeneity because of the size of the fuel pins used (0 to 8 mm) and the pitch of the lattice (0 to 9 mm). The computing methods used permit a correct treatment of the heterogeneities of more complex lattices constructed in critical assemblies either with rods (MASURCA) or with plates (SNEAK) and thus of transport with reduced uncertainties (+-100 pcm) of the results of integral experiments in power reactor cores. The perturbations of reactivity or distribution induced in the cores by the control rods or the presence of blankets are treated in the diffusion approximation. This approximation leads to an overestimate of the effect of the control rods (-7%) compared to the more refined but more costly transport theory. The treatment of cores by the heterogeneous concept is presently identical to that of the classical cores (of the SUPER-PHENIX type): the procedure to be used to define multigroup cross sections is the subject of studies underway. The experimental program which has been developed in MASURCA (PRERACINE program should permit optimizing the multigroup cross-section calculation method for this type of core. (ERA citation 04:053202)

IKE-6-119 PC **A06**/MF **A01**
Institut fuer Kerntechnik und Energiewandlung e.V., Stuttgart (Germany, F.R.).
Application of Linear and Higher Perturbation Theory in Reactor Physics.
D. Woerner. 6 Sep 78, 101p
In German.Thesis.
U.S. Sales Only.

For small perturbations in the material composition of a reactor according to the first approximation of perturbation theory the eigenvalue perturbation is proportional to the perturbation of the system. This assumption is true for the neutron flux not influenced by the perturbance. The two-dimensional code LINESTO developed for such problems in this paper on the basis of diffusion theory determines the relative change of the multiplication constant. For perturbations varying the neutron flux in the space of energy and position the eigenvalue perturbation is also influenced by this changed neutron flux. In such cases linear perturbation theory yields larger errors. Starting from the methods of calculus of variations there is additionally developed in this paper a perturbation method of calculation permitting in a quick and simple manner to assess the influence of flux perturbation on the eigenvalue perturbation. While the source of perturbations is evaluated in isotropic approximation of diffusion theory the associated inhomogeneous equation may be used to determine the flux perturbation by means of diffusion or transport theory. Possibilities of application and limitations of this method are studied in further systematic investigations on local perturbations. It is shown that with the integrated code system developed in this paper a number of local perturbations may be checked requiring little computing time. With it flux perturbations in first approximation and perturbations of the multiplication constant in second approximation can be evaluated. (Atomindex citation 10:449424)

NUREG/CR-1008 PC **A02**/MF **A01**
Atomics International Div., Golden, CO. Rocky Flats Plant.
Reference Critical Experiments.
Progress rept. 1 Apr-30 Jun 79,
G. R. Goebel, I. Oh, and R. E. Rothe. Oct 79, 21p RFP-2990
See also report dated Jan 79, PB-292 356.

This is the fifteenth in the series of quarterly progress reports describing reference critical experiments being performed at the Critical Mass Laboratory at Rockwell International's Rocky Flats Plant for the U.S. Nuclear Regulatory Commission. The results of eight critical experiments are reported using the low-enriched, damp (H/U about 1.25) uranium oxide (U3O8) in the concrete reflector and the minimal steel reflector. The oxide alone is not critical; hence, a high-enriched (93% U-235) uranium driver section near the core center was required. The drivers used in these experiments were a uranium metal sphere, high concentration uranyl nitrate solution, and low concentration uranyl nitrate solution.

18M. Reactors (Non-Power)

CNEA-446 PC **A05**/MF **A01**
Comision Nacional de Energia Atomica, Buenos Aires (Argentina).
Very Intense Pulsed Neutron Source of the "Booster" Type.
J. M. Abbate. Sep 78, 93p
In Spanish.
U.S. Sales Only.

A compact accelerator-booster (fast, pulsed and modulated reactivity research reactor) is a new and appropriate concept for use as a very intense thermal neutron source. Its definition and feasibility have been already described in several studies showing its relative advantages in comparison with other kinds of facilities. This work, which is part of one of those studies, contains a general analysis on the meis facility parameters and core and shielding theoretical calculations. The following results were obtained: selection and test of a calculation system suitable for use in compact fast reactors; Development of a method to perform estimations in some safety and shielding problems and obtain adequate theoretical predictions on the general performance. Moreover, final results for important parameters of the feasibility study and predesign (critical mass and volume, lifetime, etc.) and others related to the use of plutonium oxide as fuel are given and then evaluations of different basic functions are shown. (Atomindex citation 10:452546)

NUREG/CR-1025 PC **A07**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Design Basis Neutronics Calculations for NRU-LOCA Experiments.
S. W. Heaberlin, U. P. Jenquin, G. W. McNair, R. T. Perry, and T. J. Trapp. Nov 79, 136p PNL-3113
Contract DOE-EY-76-C-06-1830

This report describes the approaches taken, models used and results generated to answer the neutronics questions posed. It includes a broad range of nuclear physics activities and as such provides a summary of work performed under the NRU Neutronics Task.

19. ORDNANCE

19A. Ammunition, Explosives, and Pyrotechnics

AD-A076 174/2 PC **A02**/MF **A01**
Army Armament Research and Development Command Dover Nj Fire Control and Small Caliber Weapon Systems Lab
Fracture Toughness Evaluation of Ductile Munitions Material.
Final rept.,
Carl M. Carman. Aug 79, 23p Rept no. ARSCD-TR-79009

It has been difficult to obtain fracture toughness data from actual artillery projectiles due to the stringent size requirements imposed by linear elastic fracture mechanics. This difficulty could be alleviated by an elastic-plastic stress analysis to determine the fracture toughness. The J-integral offers the most promising solution to this problem. Before applying the J-integral to projectile problems, one must determine if the results of the J-integral will be equivalent to those obtained from the standard K-test using projectile steel. The material chosen for this study was 1340 steel heat treated to 1035 MPa (150,000 psi) yield strength.

PAT-APPL-6-020 881 PC **A02**/MF **A01**
Department of the Army Washington DC
Preparation of Hexanitrostilbene with Copper Ammino Compounds.
Patent Application,
E. Gilbert. Filed 15 Mar 79, 14p AD-D006 392/5
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The present invention is based on the discovery that HNBB can be converted to HNS in yields, based on the weight of HNBB, greater than about 65% if HNBB is reacted with a cooper ammino compound with a suitable solvent. Copper ammino compounds are well known in the art and are prepared by reacting ammonia with a salt of Cu (II). For example, copper tetraamminosulfate can be prepared from copper sulfate and ammonium hydroxide in aqueous solution. This compound can be used for converting HNBB to HNS. Another method of obtaining this compound for the conversion is to form it in situ by simply adding copper sulfate and ammonium hydroxide to the reaction mixture. This is a more preferred procedure since it is more convenient. Copper sulfate is the preferred procedure since it is more convenient. Copper sulfate is the preferred salt; other cupric salts, such as cupric chloride and cupric nitrate are also suitable for use in the process of this invention. It is much preferred to use anhydrous copper sulfate when forming the copper ammino compounds in situ. The ammino compound from copper sulfate pentahydrate is considerably less reactive in the reaction than the ammino compound from anhydrous copper sulfate. The monohydrate can be similarly used but it is not quite as good as the anhydrous copper sulfate. In addition, the anhydrous copper sulfate is substantially insoluble in the solvents, notably dimethylformamide; whereas the pentahydrate is fairly soluble. The ammino compound which is formed in situ or added directly to the reaction mixture is generally substantially insoluble in the solvents used. It should be noted that one would not expect such an insoluble material to effect a conversion of HNBB to HNS.

PAT-APPL-6-020 889 PC **A02**/MF **A01**
Department of the Army Washington DC
Preparation of Hexanitrostilbene.
Patent Application,
E. Gilbert. Filed 15 Mar 79, 12p AD-D006 393/3
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

There is disclosed a process for converting 2,2',4,4',6,6'-hexanitrobibenzyl (HNBB) to 2,2',4,4'6,6'-hexanitrostilbene (HNS) in high yields by reacting HNBB with a halogenating agent in the presence of a base in an organic solvent or a liquid

suspending agent. A preferred halogenating agent is bromine; a preferred base is pyridine; a preferred solvent is dimethylformamide; and a preferred liquid suspending agent is toluene or chlorobenzene. (Author)

PAT-APPL-6-029 809 PC **A02**/MF **A01**
Department of the Army Washington DC
Pyrophoric Flame Composition.
Patent Application,
Milton A. Tulis, Charles M. Lawson, and Lawrence D. Whiting, III. Filed 13 Apr 79, 21p AD-D006 399/0
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A low viscosity liquid pyrophoric composition, which provides good safety under ordinary handling conditions but ignites rapidly when disseminated into the atmosphere, consists essentially of about from 50% to 85% by weight of a homogeneous solution of polyisobutylene in triethylaluminum and about from 15 to 50% of a saturated aliphatic hydrocarbon of 5 to 12 carbon atoms, said composition having a viscosity ranging about from 30 to 150 centistokes at 40 C. When explosively disseminated into the atmosphere, the composition generates a fireball having a controlled ignition delay, which permits essentially complete vaporization of the hydrocarbon prior to ignition of the TEA, thereby producing rapid pulses of intense thermal radiation having a temperature as high as 1200 C (2192 F) and higher. (Author)

PAT-APPL-6-042 825 PC **A02**/MF **A01**
Department of the Army Washington DC
Antipropagation Explosive Packaging Means.
Patent Application,
Philip M. Howe. Filed 29 May 79, 18p AD-D006 401/4
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

For purposes of transportation and storage, munitions are classified according to the nature, level or extent of potential damage which would result through accidental or untimely explosion of the munition involved. One of the most hazardous categories in such classification is the 'mass detonating' class of munitions wherein detonation of one munition in close proximity with other similar munitions will cause most or all of the others to detonate. The violence and consequent loss, damage and injury from the resulting explosion is proportional to the total number of munitions in the package or assemblage. In the absence of measures which can effectively prevent interround propagation of munitions in an aggregation or ensemble mode of packaging, such items must be isolated from each other by individual packaging, remote dispersal and single-step handling procedures, all of which increase weight, overall bulk, time consumption, labor and materiel costs for packaging, handling, shipping and storing munitions in the 'mass detonating' category. (Author)

PAT-APPL-6-043 767 PC **A02**/MF **A01**
Department of the Army Washington DC
Solid Propellant Grain for Improved Ballistic Performance of Guns.
Patent Application,
Robert W. Deas. Filed 30 May 79, 16p AD-D006 402/2
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention has to do with propellants for use in gun systems. More specifically, this invention has to do with a novel shape for propellant grains which enhances the burning characteristics of the propellant material such as to achieve higher muzzle velocity of a projectile without increasing the maximum experienced pressure within the barrel of the gun in use. As is well known, the purpose of propellant materials in a gun system is to provide a source of energy for accelerating a projectile within the bore of a gun so that a desired muzzle velocity for the projectile is achieved. The projectile, initially at rest, is accelerated by force resulting from the generation of high pressure gaseous products in response to the ignition and burning of the propellant material. As is also generally known, the burning of solid propellants ordinarily utilized in gun systems is initiated by some action, e.g., the release of a firing pin, which generates a small amount of hot gas in proximity to the propellant thus causing the propellant material to ignite and the burn process to commence.

PAT-APPL-6-050 288 PC **A02**/MF **A01**
Department of the Army Washington DC
Projectile.
Patent Application,
A. Flatau. Filed 20 Jun 79, 14p AD-D006 408/9
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A projectile is adapted to be launched from a barrel. The projectile includes a tubular housing and a structural member. The tubular housing has a forward inlet throat and aft nozzle. An annular layer of solid fuel combustible material is mounted within the housing between the inlet throat and nozzle. The structural member is detachably mounted over the nozzle. The structural member is sized to cover the nozzle so that pressurized gas applied to the structural member forwardly thrusts the housing. Thus the projectile is gun-launchable and can produce a ramjet action. (Author)

PAT-APPL-930 083 PC **A02**/MF **A01**
Department of the Army Washington DC
Centrifugal Ball Cam Locking Device.
Patent Application,
Willard R. Benson. Filed 1 Aug 78, 9p AD-D006 414/7
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A plurality of inertiallly responsive balls are disposed intermediate a housing of a spin stabilized projectile and a critically angled cam incline member for preventing the shift of stacked cargo during projectile flight. The combination of projectile spin and critical cam angle of the incline member is used to provide centrifugal and holding forces of sufficient magnitude to produce a self-locking taper effect which restricts loose stacked cargo member from causing destabilization and reduction in projectile range. (Author)

PAT-APPL-933 240 PC **A02**/MF **A01**
Department of the Army Washington DC
A Direct Method of Measuring the Intensity of Light and Other Radiation Sources Without Knowledge of the Source Distance.
Patent Application,
Chester L. Smith, and David N. Everswick. Filed 14 Aug 78, 13p AD-D006 415/4
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Aircraft and artillery flares are tested at various proving ground and test areas. These tests are used to compare flares and flare systems and to evaluate optimum methods of deployment for tactical use. The two most significant parameters measured are the illumination produced by the item and its candlepower. The illumination produced by a flare source can be directly measured by means of photocell. However, to obtain candlepower it is necessary to know the distance from the source to the transducer. This is due to the inverse square law relation E - I/D(2), where E is illumination in terms of foot-candle, I is intensity in candlepower and D is distance in feet. In addition, unless the cell is always aimed in the direction of the flare source it is also necessary to know the angle of the cell's active surface in relation to the flare's position. This is necessary to correct for the sensitivity due to loss in effective surface area. (Author)

PAT-APPL-970 404 PC **A02**/MF **A01**
Department of the Army Washington DC
Non-Polluting Process for Desensitizing Explosives.
Patent Application,
M. Roth. Filed 18 Dec 78, 14p AD-D006 421/2
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The present invention relates to the area of explosive materials, and specifically to the desensitization and disposal of such explosives. It has long been a practice to destroy explosive materials and propellants determined to be either obsolete or deteriorated by open incineration or burning. With the enactment of the pollution abatement legislation, the practice of open burning of propellants and explosives had to be replaced by controlled incineration so that ambient air standards could be met. Controlled incineration generally requires that the explosive material in question be placed in a slurry in water prior to being ground up and incinerated so that the materials would be safer to handle. The concentration of explosive material that could be placed in such a slurry, however, was restricted to an amount approximately equal to that required to barely sustain combustion in order to minimize the hazard of burning excessive quantities. Such restriction on concentration increases the cost of incineration, as the time for processing a given quantity of explosive is increased and the fuel required to incinerate that explosive is likewise greater.

19B. Bombs

AD-A076 002/5 PC **A03**/MF **A01**
Wright Air Development Center Wright-Patterson AFB Oh
Structural and Environmental Testing of Aero X61 Bomb Racks.
Technical rept. Aug 51-Feb 52,
Paul B. Winterbalter. Apr 52, 38p Rept no. WADC-TR-52-98

The purpose of the static and environmental testing conducted on the Aero X61A and Aero X61B bomb racks was to determine the suitability of the bomb racks to function under adverse climatic conditions and , in addition, to determine the capability of the racks to release loads approximating 10,000 lbs. The bomb racks are designed for the release of 2000 lb. stores. Mechanical revisions in the racks were necessitated by the need for a release mechanism capable of releasing the 10,000 lb. load. Redesign recommendations were forwarded to the Douglas Aircraft Company as operational failures in the bomb racks were encountered and analyzed. These failures usually resulted as attempts were made to operate the racks under the higher load condition. It is concluded that the Aero X61B bomb rack, incorporating the design revisions as recommended, is acceptable for Air Force use.

19D. Explosions, Ballistics, and Armor

AD-A075 809/4 PC **A03**/MF **A01**
Naval Surface Weapons Center White Oak Lab Silver Spring Md
Dynamical Model for Explosion Injury to Fish.
Final rept.,
John F. Goertner. 18 Dec 78, 35p Rept no. NSWC/WOL/TR-76-155
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

A new method is given for calculating kill probability for bladder fish subjected to the rapidly varying pressure field of an underwater explosion. The method consists of an approximate calculation for the extreme values of compression and extension of the fishes' gas-filled swim bladder in response to the explosion pressure wave. The calculations are made for the damped radial oscillations of a spherical air bubble in water. The kill probability is then calculated as an experimentally deterimined function of the ratio of maximum to minimum radius during the oscillatory response. For each species of fish the effective bubble radius for the calculations is determined thru correlating the observed injuries with the calculated radius ratio. (Author)

AD-A076 170/0 PC **A03**/MF **A01**
Army Armament Research and Development Command Aberdeen Proving Ground Md Ballistics Research Lab
Muzzle Velocity Drop in Wear-Limited Army Guns.
Memorandum rept.,
J. Richard Ward , and Ingo W. May. Sep 79, 26p Rept no. ARBRL-MR-02952
Supersedes Rept. no. ARBRL-IMR-543, dated Feb 77.

The authors conclude: (1) The ratio of muzzle velocity drop/initial muzzle velocity correlates well with land diameter increase/initial land diameter for a number of wear-limited Army guns. All exceptions noted to the correlation were for obturated projectiles or for projectiles fired from the M199 cannon. In this cannon, the grooves do not wear until the lands disappear which should reduce gas blowing by the projectile as a function of the land erosion. After complete land erosion, blow-by should increase. (2) Of the two XM185 cannons from which the muzzle velocity drop for the M119 charge was estimated as a function of tube wear, one tube had significantly lower muzzle velocity drop than the drop predicted from the above correlation. Data in the 155mm firing table for M119 muzzle velocity drop vs rounds may underestimate the actual muzzle velocity drop. (3) An obturator placed on the M107 projectiles to reduce muzzle velocity drop did indeed raise the muzzle velocity of the M107 projectile when fired from a worn cannon. The increase was not as great as that for obturators. This suggests: the rotating band design is more important than the obturator in reducing the rate of muzzle velocity drop as the gun tube wears; and that band diameter must be considered to obtain a universal plot of normalized wear vs velocity loss.

AD-A076 175/9 PC **A03**/MF **A01**
Army Armament Research and Development Command Dover Nj Fire Control and Small Caliber Weapon Systems Lab
Interior Ballistics Modeling Applied to Small Arms Systems.
Technical rept.,
Sidney Goldstein. Jun 79, 38p ARSCD-TR-79001, AD-E400 337

The empirical models currently used in the design of small arms interior ballistics systems are reviewed. The development of propellant deterrent technology and closed bomb burning-rate techniques is discussed. Propellant grain size distribution and averaging techniques, temperature sensitivity, and energy losses are also covered. The current use of two-phase, nonsteady flow methods to describe interior ballistics systems is reviewed. It is concluded that each of the models performs a different task in the proper design of a weapon system.

AD-A076 337/5 PC **A11**/MF **A01**
New Mexico State Univ Las Cruces Physical Science Lab
Fixed Camera Data Dusty Infrared Test-I (DIRT-I) 2 October through 14 October 1978.
Final data rept.
Aug 79, 232p NMSW/PSL/FDR-37179, ERADCOM/ASL-CR-79-0008-1
Contract DAAD07-79-C-0008

The Dusty Infrared Test-I (DIRT-I) was conducted in October 1978 to quantify electromagnetic propagation through artillery dust clouds. This report, which is one in a series of reports on DIRT-I, describes the techniques for determining cloud size, shape, and relative position as a function of time. Cloud growth data are given for 29 of 36 discrete events and cloud periphery imaging data are given for the 37th continuous fire events. (Author)

PAT-APPL-6-020 890 PC **A02**/MF **A01**
Department of the Army Washington DC
Differential Pressure Gauge.
Patent Application,
Noel H. Ethridge. Filed 15 Mar 79, 13p AD-D006 394/1
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A gauge for measuring differential pressure in an explosive blast wave, wind tunnel, or shock tube, utilizes a tubular housing having a conical axially aligned inlet port, a cylindrical cavity which is divided into fore and aft sections by a transversely disposed pressure responsive diaphram. A plurality of symmetrically disposed off-set stagnation inlet tubes and a plurality of circumferentially positioned flow compensated side-on overpressure input slots are used to communicate with each of the respective fore and aft sections of the cavity. Variation in stagnation and side-on overpressures cause diaphram movement which is detected by a friction-free sensing member. (Author)

PAT-APPL-6-024 140 PC **A02**/MF **A01**
Department of the Army Washington DC
In-Bore Telemetry Information Measuring System.
Patent Application,
William Donnally. Filed 26 Mar 79, 22p AD-D006 396/6
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The present invention relates to the design, development and malfunction investigations of the tube-fired munitions. More particularly, the invention herein relates to a low cost system for the telemetering of delayed high-G in-bore information. In the past, certain techniques for acquiring in-bore information have not been completely satisfactory in furnishing a complete environmental profile of a shell while in-bore. These techniques have included: (1) Hardwiring of the shell transducer directly to recording equipment located outside the gun tube. This technique suffered from the problem of wire breakage at higher firing zones. (2) Radio frequency transmission of in-bore data out of the gun tube to the ground station recording equipment. This has often been less than optimum due to blow-by gases attenuating the R. F. signal, reflections, and cancellations in the gun tube. (3) Laser beam transmission of in-bore data out of the gun tube. This has not been successful due to difficult alignment problems of transmitter and receiver, and obscuration of the light beam by blow-by gases. The aforementioned radio frequency technique utilized a particular charge-coupled analog delayed device (CCD) to delay in-bore information until the projectile clears the gun barrel and the ionized cloud. (Author)

PB80-106362 PC **A03**/MF **A01**
Martin Marietta Labs., Baltimore, MD.
The Science of Blasting,
Stephen R. Winzer, Victor I. Montenyohl, and Andrew Ritter. Nov 78, 30p NSF/RA-780679
Contract NSF-C-77-05171

Thirty-seven open pit production blasting operations have been monitored using high-speed cameras running between 500 and 7000 frames per second. Analysis of the resulting films reveals irregularities in timing, including sequencing errors and crowding, confirming results of laboratory of ms delay blasting caps. Where blasting parameters are otherwise constant and within recommended guidelines, timing problems dominate the overall performance operation. Model tests in layered Homalite 100, designed to simulate joint or bedding planes in rock, indicate the importance of the stress waves generated by the explosive in developing the crack network which is ultimately responsible for the fragmentation seen in the resulting muckpile. These mechanisms are strongly supported by high-speed film studies in Pinesburg, Md. Experiments in controlling relief in deep shots using borehole geometry and hybrid initiation systems were carried out. Results suggest that the 1 ms/ft. of burden guideline developed by Bergmann, et al., is too short, and that much longer times are necessary to optimize fragmentation and muck digability. Longer times are found to reduce noise, vibration, and flyrock.

19F. Guns

AD-A075 680/9 PC **A10**/MF **A01**
Army Combat Developments Command Infantry Agency Fort Benning Ga
Army Small Arms Requirements Study II (ASARS II): First In-Process Review After Action 16 - 17 June 1971.
18 Jun 71, 225p

The purpose of ASARS is to develop documented data pertaining to the interaction of variable small arms characteristics, and the capability, through scientific method, of conducting subsequent trade-offs among these characteristics. The results of ASARS, in conjunction with the results of other ARSAP tasks, will assist in the development of the optimum small arms system for the future.

AD-A075 709/6 PC **A03**/MF **A01**
Army Infantry Board Fort Benning GA
Infantry Weapons Test Methodology Study: Integrated Operational Test and Analysis Procedures for Small Arms Weapons Systems Evaluation.
Final rept.
May 72, 50p Rept no. USAIB-3319
See also Volume 1, AD-890 998L.

The purpose of this document is to summarize the findings of the Small Arms Methodology Study in terms of a working format for weapon system evaluation using the three small arms test facilities. Section 1 discusses the major parameters of the integrated test procedure. Section 2 describes procedures for training and scheduling test soldiers through the facilities taking into account the two major test variables, weapons and modes of fire. In addition, rationale is provided for the recommended sample size estimation and test soldier selection techniques. Section 3 describes the analytical procedure to be used on the field-generated data. The data are used for two purposes: selection of the most suitable combat weapon system and optimization of weapon system performance. The procedure described emphasizes the selection of the superior weapon at the earliest possible point, consistent with a thorough evaluation of operational performance, in order to maximize the time available for improving the selected weapon's performance.

AD-A075 710/4 MF **A01**
Army Infantry Board Fort Benning Ga
Infantry Weapons Test METHODOLOGY Study. Volume II. Antitank Weapons Test Methodology.
Final rept.
17 Jan 72, 239p Rept no. USAIB-3319-VOL-2
See also Volume 4, AD-A075 711.
Availability: Microfiche copies only.

This report attempts to answer the following four objectives with respect to AT test methodology: (1) Determine those factors influencing the evaluation of Infantry weapons under realistic combat environment; (2) Develop techniques and methods to measure critical factors influencing weapon evaluation; (3) Isolate those factors which are subjective, involving judgement and experience, and which are not amenable to measurement from those which are, and establish the relative importance of each; and (4) Develop automated test facilities which will permit operational testing with a minimum of maintenance and technical support.

AD-A075 711/2 PC **A05**/MF **A01**
Army Infantry Board Fort Benning Ga
Infantry Weapons Test Methodology Study. Volume IV. Grenade Launcher Test Methodology.
Final rept.
1 Apr 72, 96p Rept no. USAIB-3319-VOL-4
See also AD-A075 709.

This is the fourth in a series of five reports which summarize the findings of the Infantry Weapons Tests Methodology Study conducted by the United States Army Infantry Board. It summarizes findings concerning the operational evaluation of grenade launching weapon systems, and also includes four appendices. Appendix I contains a description of a grenade impact scoring system which was developed during the study. Appendix II is composed of the recommended subtests for evaluating grenade launcher performance. Appendix III contains a description of an analytical technique for evaluation of weapon system performance; this appendix and the methodology described under Objective 2 are designed to provide the basis for an operational tests procedure for grenade launching weapon systems. Appendix IV is a technical memorandum which describes the method used to determine the resolution and accuracy of the grenade impact scoring system.

AD-A075 715/3 PC **A06**/MF **A01**
Army Combat Developments Command Infantry Agency Fort Benning Ga
Infantry Agency Army Small Arms Requirements Study I (ASARS I). In Process Review.
19 Mar 70, 109p

No abstract available.

AD-A075 733/6 PC **A02**/MF **A01**
Army Test and Evaluation Command Aberdeen Proving Ground Md

Self-Propelled Artillery.
Final rept. on test operations procedures.
9 Oct 79, 14p Rept no. TOP-3-2-506
Supersedes Rept. no. MTP-3-2-506, dated 22 Dec 65, AD-717 316.

This TOP provides a method of evaluating self-propelled artillery. It covers safety evaluation, functional, and firing tests; human factors engineering and maintenance evaluation and also includes a data collection sheet for safety considerations. It is not applicable to vehicle portion.

AD-A075 741/9 PC **A02**/MF **A01**
Army Test and Evaluation Command Aberdeen Proving Ground Md
Weapon Pressure Measurements.
Final rept. on test operations procedure.
5 Oct 79, 21p Rept no. TOP-3-2-810
Supersedes Rept. no. TOP-3-2-810, AD-A059 369.

This report provides a method for measurement of weapon chamber and recoil pressure. It describes crusher gages, electrical transducers for pressure-time measurements, and dynamic pressure generators. It applies to evaluation of projectile, propellant, ignition system, and cannon design and performance.

AD-A075 943/1 PC **A04**/MF **A01**
Naval Postgraduate School Monterey Ca
Transient Response of a Gun System under Repeated Firing,
Arthur P. Boresi. Sep 79, 74p Rept no. NPS-69-79-008

This report develops an analysis of the transient response of a gun barrel to repeated firing. A finite element approach is used. Initial linear and angular displacements and velocities may be prescribed. A digital computer program based upon the analysis has been developed. The position, velocity, and acceleration of node points are outputs. A plot option is available. (Author)

AD-A076 138/7 PC **A05**/MF **A01**
Naval Postgraduate School Monterey Ca
Combat Damage Assessment Team, A-10/GAU-8 Low Angle Firings versus Simulated Soviet Tank Company (15 June 1978).
Special rept.,
Russel H. S. Stolfi , J. E. Clemens , and R. R. McEachin. Aug 79, 89p Rept no. NPS56-79-006
Contracts MIPR-F47615-78-5209, MIPR-FY-7621-78-90220

This report, the first in a two volume set, describes firings of the A-10/GAU-8 weapon system on 15 June 1978, against a Soviet tank company simulated by ten combat loaded M-47 tanks. The pilots making the firing passes attacked at low altitude and corresponding low dive angles simulating movement through a hostile air defense system. Ammunition used in the attacks comprised 30mm armor piercing incendiary rounds, which proved to be effective damage agents against substantial areas of the U.S. M-47 tanks used as targets. The pilots in 23 firing passes achieved 347 impacts on the ten target tanks. The impacts included 50 perforations of the armored envelopes and resulted in damage comprising six tanks catastrophically killed, three tanks incapable of fire and movement, and one tank with degraded mobility.

AD-A076 177/5 PC **A03**/MF **A01**
Army Armament Research and Development Command Aberdeen Proving Ground Md Ballistics Research Lab
Prediction of Erosion from Heat Transfer Measurements.
Technical rept.,
Timothy L. Brosseau , Bertram B. Grollman , and J. Richard Ward. Jul 79, 36p ARBRL-TR-02181, AD-E430 314

A review is made of existing empirical models for predicting erosion rates of large caliber guns. All the empirical models are based on a correlation between calculated bore surface temperature and the measured wear rate. This prompted an investigation into correlating measured total heat input with the erosion rate. A correlation was obtained even for rounds with different wear-reducing additives. Such rounds have nearly identical interior ballistics but differ in the amount of heat transferred to the barrel and the erosion rate.

AD-A076 219/5 PC **A06**/MF **A01**
Calspan Corp Buffalo N Y
Shock Tube Gun Melting Erosion Study.
Final rept. 13 May 77-29 Dec 78,
Franklin A. Vassallo , and W. Richard Brown. Aug 79, 117p CALSPAN-VQ-6123-D-1, ARBRL-CR-00406, AD-E430 312
Contract DAAK11-77-C-0018

Heat transfer, melting, and erosion tests were conducted using a unique Shock Tube Gun Facility available at Calspan. Materials of interest were subjected to intense heating using non-reactive gas mixtures. Pure melting of materials was obtained at heating conditions representing those of actual guns. A computer code was formulated, written, tested, and shown to adequately normalize the gross thermal data, thus permitting determination of expected bore temperatures and/or material loss for given heating conditions. It was found that, although the bore surface temperature of steels tested in the non-reactive gases of the Shock Tube Gun achieved temperatures of the same magnitude as those in large caliber guns where bore surface cracking is produced, no similar surface cracking of steels was observed. It is concluded that chemical activity of gun gases is partially responsible for crack initiation in gun tubes. (Author)

20. PHYSICS

20A. Acoustics

AD-A075 768/2 Not available NTIS
Mcgill Univ Montreal (Quebec) Dept of Electrical Engineering
Transmission and Reflection of Acoustic Surface Waves at Corners,
M. Munasinghe , and G. W. Farnell. 1973, 6p
Availability: Pub. in Ultrasonics International, p119-124 1973 (No copies furnished by DTIC).

No abstract available.

AD-A075 816/9 PC **A02**/MF **A01**
Aerospace Corp El Segundo Ca Vehicle Engineering Div
The Generation of a Tollmien-Schlichting Wave by a Sound Wave,
John W. Murdock. 31 Aug 79, 22p Rept no. ATR-79(7775)-1
Contract N00014-78-C-0491

A spectral numerical method is used to study the two-dimensional unsteady flow over a flat plate in the presence of a plane sound wave propagating parallel to the flow. For s = omega x/u at infinity > 0(1), no observable interaction or energy interchange between the sound wave and the Tollmien-Schlichting wave is present. In the region s < or = 0(1), near the leading edge, an interaction occurs; the magnitude of this interaction is computed. A plane sound wave with dimensionless frequency omega nu/U-square at infinity = .000056 generates a Tollmien-Schlichting wave of the same frequency and an amplitude at the first neutral point .0001 times the sound-wave amplitude. Computations at a second, lower frequency result in a lower neutral point amplitude. The response of the boundary layer to large unsteady disturbances is discussed and compared with published behavior based on the boundary layer equations. Solutions of the Orr-Sommerfeld equation are examined and found to have a different character for s > or < 0(1) consistent with the more complete equations. (Author)

AD-A075 945/6 PC **A03**/MF **A01**
Naval Ocean Systems Center San Diego Ca
Underwater Sound Mathematical Model. Theoretical Discussion.
Interim rept. Jan-Jul 79,
R. Bell. 15 Aug 79, 26p Rept no. NOSC/TD-272

The physical phenomena which affect performance measurements at SACS (Sensor Accuracy Check Site) must in part be studied through the use of an acoustic mathematical model. This document derives equations for the summation of two independent acoustic waves at a point receiver, derives equations for the summation of multiple acoustic waves at a point receiver, defines a three-dimensional source cardioid, and develops general equations for the summation at a point receiver of direct and reflected path acoustic waves emanating from multiple cardioid sources. (Author)

AD-A076 060/3 PC **A04**/MF **A01**
Battelle Columbus Labs Durham N C
Atmospheric Effects on the Speed of Sound.
Technical rept.,
E. A. Dean. Aug 79, 60p ERADCOM/ASL-CR-79-0100-4
Contract DAAG29-76-D-0100
Prepared in cooperation with Texas Univ. at El Paso. Dept. of Physics.

The small-signal speed of sound in humid air is calculated from a model which includes the real-gas effects from the equation of state for humid air and the vibrational dispersion due to N2, O2, and CO2 relaxation. Other atmospheric effects such as dispersion due to viscothermal and rotational relaxation, heat radiation, propagation along the air-ground boundary, the density gradient, turbulence, aerosols and fogs are considered and found to be unimportant for frequencies between 1 Hz and 5 MHz (at one atmosphere). The uncertainty in predicting the sound speed varies between 0.22 m/sec at -90 C to 0.05 m/sec at 90 C. Experimental results in humid air at 20 C and 30 C are in excellent agreement with the model. For the propagation frequency of 20 Hz, it is found that the presently used sound-ranging formula, c = 20.06 x square root of T sub s, where T sub s = .75t sub v + .25t + 273.2 (t sub v = virtual temperature), differs by up to 0.5 m/sec over the range -60 C to 60 C. A correction to the 'sonic' temperature determination is suggested which results in deviations of less than 0.05 m/sec over the temperature range from -60 C to 50 C and for relative humidities from 5% to 100%. (Author)

AD-A076 117/1 PC **A04**/MF **A01**
Institute for Acoustical Research Miami Fla
Effects of Ocean Fronts on Multipath Vertical Angles and the Associated Biases in Array Bearing Estimation,
R. P. Flanagan , and X. Zabalgogeazcoa. Jul 79, 55p Rept no. IAR-79002
Contract N00014-74-C-0229

An oceanic frontal system perpendicular to the propagation path is modeled with a deep receiver in warm water and a shallow source which is moved through the frontal system into progressively colder water. A ray model is used to calculate the arrival structure and determine the effects of the frontal system on ray amplitude and vertical angle. The receiving horizontal line array determines the bias in bearing estimation resulting from the changing multipath structure. This bias is found to be heavily dependent on array orientation and range into the frontal system while being only slightly dependent on array beamwidth. The underlying physics causing the multipath variations is the frontal system acting as a focusing lens. When the transducer positions are reversed, that is a deep receiver in cold water and a shallow source in progressively warmer water, the frontal system acts as a diverging lens.

AD-A076 232/8 PC **A02**/MF **A01**
Army Environmental Hygiene Agency Aberdeen Proving Ground Md
Noise Exposure Evaluation in Radio Terminal Set AN/TRC-112, 21 June 1979.
Final rept.,
Felix Z. Sachs , and Jeffrey D. New. 19 Oct 79, 24p Rept no. USAEHA-51-34-0223-80
Report on Acoustical Engineering Noise Reduction Special Study.

Noise levels in two radio terminal sets, AN/TRC-112, were measured to determine if the operators are exposed to noise hazardous levels and to define noise control approaches if required. The noise levels in the two terminal sets were below the US Army 85 dB, A-weighted hearing conservation criterion. The character of the noise was judged to be annoying because of an audible high frequency whine. Some noise control is relatively easily attainable but reductions of more than about 4 dB and elimination of the whine will require some redesign of the power amplifier. (Author)

AD-A076 269/0 PC **A02**/MF **A01**
Xonics Inc Van Nuys Ca

Long Range Acoustic Propagation Project (LRAPP).
Final rept. 1 Nov 73-30 Jun 77.
30 Sep 77, 9p
Contract N00014-74-C-0222

From 1 November 1973 through 30 June 1977, Xonics provided continual technical support and services to the Long Range Acoustic Propagation Project (LRAPP). This report provides a description of the work performed under each modification of the contract and provides a financial summary. Xonics provided technical support services for the LRAPP Measurement Program that included technical liaison, monitoring, and assistance in the implementation of LRAPP Data Analysis Plans. In addition, Xonics provided acoustic measurement systems assessment assistance to LRAPP in the form of participation in the Measurements Systems Advisory Group (MSAG). MSAG provided recommendations and performance assessments of the various measurement systems used in LRAPP-sponsored environmental acoustic exercises. All appropriate activity reports and summaries were prepared and submitted to the Scientific Officer.

20B. Crystallography

AD-A075 836/7 PC **A02**/MF **A01**
Rockwell International Thousand Oaks Ca Science Center
Growth of HgCdTe by Modified Molecular Beam Epitaxy.
Semi-annual rept. no. 1, 1 Mar-31 Aug 79,
J. T. Cheung. 28 Sep 79, 22p Rept no. SC5202.3SA
Contract MDA903-79-C-0188, DARPA Order-3704

This is the first semi-annual technical report of a program to study a novel approach to the epitaxial growth of HgCdTe. In this report, we describe the general approach in detail. We have also completed the assembly and test of the main chamber. In addition, we also made extensive literature survey on the subject of laser evaporation and estimated the growth. (Author)

CONF-790442-17 PC **A03**/MF **A01**
Syracuse Univ., NY. Dept. of Chemical Engineering and Materials Science
Epitaxy and Misfit Dislocations in Large Misfit Systems.
R. W. Vook. 1979, 26p
Contract EG-77-S-02-4496
International conference on metallurgical coatings, San Diego, CA, USA, 23 Apr 1979.

The manner in which an epitaxial overgrowth is accommodated to a substrate composed of a different material depends on such factors as the surface and interfacial energies and the lattice misfit. The former tends to control the growth mode while the latter is an important factor in determining the magnitude and presence of elastic strain and misfit dislocations. In small misfit systems, the overgrowth tends to be pseudomorphic with the substrate up to a critical thickness beyond which the elastic strain decreases as the misfit dislocation density increases. In large misfit systems pseudomorphism doesn't occur because the critical thickness is less than a monolayer. Also the expected misfit dislocation spacing is less than what can be resolved by conventional transmission electron microscopy. Experimental results, however, indicate fairly widely spaced dislocations with average spacings that are weakly if at all dependent on overgrowth thickness. By contrast the elastic strains decrease in the expected manner as the film thickens. The inadequacy of the conventional lattice misfit theory in large misfit systems is not surprising because in this case one of the basic assumptions of the theory is violated. Namely small areas of poor fit are not separated by large areas of good fit. In fact, essentially the whole interface consists largely of regions of poor fit. For this reason, it has been suggested that coincidence lattice misfit theory may be more usefully applied to the growing bilayer in a manner analogous to the natural lattice misfit theory used for small misfit systems. Recent experimental results on various systems using smooth (111) fcc metal substrates have lent substantial support to this view. (ERA citation 04:050807)

PAT-APPL-6-046 961 PC **A02**/MF **A01**
Department of the Army Washington DC
Method of Growing Single Crystals.
Patent Application,
Thomas R. Aucoin, Abraham Schwartz, Melvin J. Wade, and Roger J. Malik. Filed 9 Jun 79, 7p
AD-D006 407/1
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The general object of this invention is to provide a method of growing single crystals of Berlinite. A further object is to provide such a method wherein the single crystals grown will be of large size, high purity, and exceptional quality. A still further object of the invention is to provide such a method wherein the resulting crystals can be used as temperature compensated piezoelectric material in applications such as resonators for oscillators and filters, delay lines, and frequency filters for correlation, pulse compression, and matched filtering. The foregoing objects now have been attained by growing single crystals of alpha aluminum phosphate from seeded solutions of aluminum orthophosphate and orthophosphoric acid in such a manner as to provide direct visual observation of the crystal growth process and allow precise determination of nucleation and growth kinetics.

UCRL-Trans-11480 PC **A02**/MF **A01**
Rhombic Modification of Beryllium Fluoride.
Yu. M. Korenev, Yu. P. Simanov, and A. V. Novoselova. 1962, 7p
Contract W-7405-ENG-48
A , Dokl. Akad. Nauk SSSR, 147 n4 P846-848 1962.

A modification of BeF sub 2 similar in structure to low-temperature quartz was detected in a study of the system NaF--BeF sub 2 . The modification has a hexagonal lattice with the constants a = 4.72 kKh, c = 5.18 kKh, and c/a = 1.10. Another modification exists in the range 680-420 exp 0 in a thermographic investigation of the system. Results from x-ray diffraction indicate that the lattice is body-centered. There is a subcell with a volume equal to 1/8 the matrix lattice. (ERA citation 04:050384)

20C. Electricity and Magnetism

AD-A075 928/2 PC **A02**/MF **A01**
Rome Air Development Center Hanscom AFB Ma Deputy for Electronic Technology
Modes of Dielectric Waveguides of Arbitrary Cross Sectional Shape,
L. Eyges , P. Gianion , and P. Wintersteiner. 22 Jan 79, 12p Rept no. RADC/ETR-79-0023
Pub. in Jnl. of the Optical Society of America, v69 n9 p1226-1235 Sep 79.

No abstract available.

N80-10435/9 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, D. C.
Two-Dimensional Nonstationary Model of the Propagation of an Electron Beam in a Vacuum.
S. L. Ginzburg, and V. F. Dyachenko. Oct 79, 14p NASA-TM-75693
Contract NASW-3199
Tran-Transl. Into English of Dvlmernaya Nestatsionarnaya Model Rasprostraneniya Elektronnogo Puchka V Vakuume (Moscow), Preprint No. 51, 1979 22 p. Subm-Transl. By Kanner (Leo) Associates, Redwood City, Calif. Original Document Prepared by Academy of Sciences (Ussr), Moscow.

A two dimensional nonstationary model of the propagation of a relativistic electron beam injected into a vacuum is considered. Collision effects are ignored and there are no external fields. Two types of the electron current propagation are shown from the computer simulation of the Maxwell-Vlasov equations.

20D. Fluid Mechanics

AD-A075 751/8 Not available NTIS
California Inst of Tech Pasadena Div of Engineering and Applied Science
A Brief Note on Linearized, Unsteady, Supercavitating Flows,
A. J. Acosta , and O. Furuya. 12 Sep 77, 4p
Availability: Pub. in Jnl. of Ship Research, v23 n2 p85-88 Jun 79 (No copies furnished by DTIC).

No abstract available.

AD-A075 771/6 Not available NTIS
Mcgill Univ Montreal (Quebec) Dept of Mechanical Engineering
Experiments on Parametric Resonance of Pipes Containing Pulsatile Flow,
M. P. Paidoussis , and N. T. Issid. Apr 75, 5p DRB-REPRINT-4174
Presented at the National Conference of Applied Mechanics, 15-17 Jun 76, Salt Lake City, UT.
Availability: Pub. in Jnl. of Applied Mechanics, v98 n2 p198-202 Jun 76 (No copies furnished by DTIC).

No abstract available.

AD-A075 853/2 Not available NTIS
California State Univ Long Beach Dept of Mechanical Engineering
Separating Boundary-Layer Flow Calculations,
T. Cebeci , H. B. Keller , and P. G. Williams. 8 Aug 77, 16p ARO-7625.48-M
Contract dahc04-68-C-0006
Prepared in cooperation with California Inst. of Tech., Pasadena. Applied Mathematics and University College, London. Dept. of Mathematics.
Avaialbility: Pub. in Jnl. of Computational Physics, v31 n3 p363-378 Jun 79 (No copies furnished by DTIC).

No abstract available.

AD-A075 893/8 PC **A07**/MF **A01**
David W Taylor Naval Ship Research and Development Center Bethesda Md
Cavitation Inception and Internal Flows with Cavitation. The Fourth David W. Taylor Lecture,
Allan J. Acosta. Oct 79, 126p Rept no. DTNSRDC-79/011

There is now a much clearer understanding, than formerly, of the role of the viscous boundary-layer flow on smooth bodies in cavitation inception. Similarly, the necessity of carefully describing the form and extent of cavitation, both at its onset and developed states for the formulation of realsitic physical models, seems well appreciated. New experimental techniques, including the measurement of freestream cavitation 'nuclei',have appeared; these promise to put laboratory and field studies of cavitation on a new quantitative level. The presently available cavitation-inception scaling concepts are considerably improved and more physically based than formerly. With all these new advances it is still not possible to predict with certainty the location, form, and onset conditions required for cavitation in an arbitrary flow. This is particulary so for unsteady cavitating flows. These flows, in addition because of the volume change of the cavitation itself, may experience large unsteady interactions with neighboring surfaces or flow fields. Initial attempts at sorting out these mutual effects for certain well-defined hydraulic systems have met with some success.

AD-A075 969/6 PC **A05**/MF **A01**
California Inst of Tech Pasadena Graduate Aeronautical Labs
Flapped Hydrofoil Tests. Water Tunnel Tests of the NACA 64A-309 Foil Section Fitted with an Adjustable Flap in Fully-Wetted and Cavitating Flows.
Technical rept. 12 Apr 78-1 Dec 79,
Paul Baloga. 8 Aug 79, 82p Rept no. GALCIT-HSWT-1131
Contract N00014-77-C-0497

Lift, drag and pitching moment data for a NACA 64A-309 foil section fitted with a plain sealed flap are presented. The flap hinge axis was located at the three-quarter chord point. The influence of positive and negative flap angles on the data was evaluated in fully wetted and cavitating flows. The data were taken in the two-dimensional working section of the GALCIT High Speed Water Tunnel. (Author)

AD-A076 015/7 PC **A03**/MF **A01**
David W Taylor Naval Ship Research and Development Center Bethesda Md Computation Mathematics/Logistics Dept
XYZPLOT: A Three-Dimensional Graphics Package for Fluid Dynamics Calculations,
Paul Morawski. Aug 75, 44p Rept no. DTNSRDC/CMD-15/75

XYZPLOT is a FORTRAN program which generates perspective and orthographic views of arbitrary three-dimensional bodies, as well as streamlines and isobars obtained from potential flow analysis. Hidden surface elements, streamline segments and isobar segments are suppressed. The program input is outlined and several examples are included. (Author)

LBL-8946 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Experimental Study of Combustion in a Turbulent Boundary Layer.
R. K. Cheng, R. G. Bill, Jr., F. Robben, R. Schefer, and L. Talbot. 1979, 10p CONF-790721-1
Contract W-7405-ENG-48
Symposium on turbulent shear flows, London, UK, 2 Jul 1979.

The effect of H sub 2 --Air combustion on induced turbulence in a heated boundary layer has been studied through time and space resolved measurements of velocity (laser Doppler anemometry) and density (Rayleigh scattering). From these measurements mean, rms fluctuations, probability density functions and auto-correlations were obtained by digital processing. The experimental conditions covered equivalence ratio from 0 to 0.3, wall temperature between 1100 to 1300 exp 0 K and free stream velocity from 14 to 22 m/sec. A typical Reynolds number based on the free stream velocity was 3 x 10 exp 5 . Three modes of combustion were indicated: (1) surface reaction, (2) surface reaction combined with gas phase reaction in the boundary layer, (3) flame-like structure situated at the edge of the boundary layer. Velocity fluctuations of about 4% in the non-heated boundary layer were reduced to 2% by wall heating. Density fluctuations of 8 to 10% were observed in the heated boundary layer both with and without combustion. The maximum density gradient region of the flame-like structure was found to fluctuate at a fairly regular rate of 0.5 to 1.25 Khz depending on various conditions. (ERA citation 04:049331)

N80-10461/5 PC **A12**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Electrical Engineering and Computer Science.
Flow on Magnetizable Particles in Turbulent Air Streams.
Ph.D. Thesis.
K. R. Davey. Aug 79, 265p NASA-CR-162418
Grant NSG-1453

The flow of magnetizable particles in a turbulent air stream in the presence of an imposed magnetic field and the phenomenon of drag reduction produced by the introduction of particles in turbulent boundary layer are investigated. The nature of the particle magnetic force is discussed and the inherent difference between electric and magnetic precipitation is considered. The incorporation of turbulent diffusion theory with an imposed magnetic migration process both with and without inertia effects is examined.

UCRL-82801 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Vessel Discharge by Friction Dominated Tube Flow.
C. S. Landram. Jun 79, 16p CONF-790583-1
Contract W-7405-ENG-48
Gas dynamics conference, Livermore, CA, USA, 22 May 1979.

The analytical complexities associated with predicting the discharge of a contained gas from its vessel through a long isothermal tube are simplified. The choking and unchoking temporal regions are shown to be dependent upon the form taken for friction factor, and the solution is therefore shown to depend rather intimately on such forms. Measured and calculated vessel pressure histories are favorably compared for the case of an ideal gas (He) discharging to the atmosphere in laminar flow through a tube of length to diameter ratio 1.2 x 10 exp 4 . (ERA citation 04:049333)

20E. Masers and Lasers

AD-A075 646/0 Not available NTIS
Defence Research Establishment Valcartier (Quebec)
A Purely Chemical HC1 Laser Employing Transverse Flow,
Sara Joan Arnold , Kenneth D. Foster , David R. Snelling , and Robert D. Suart. 30 Sep 77, 11p Rept no. DREV-REPRINT-4218
Availability: Pub. in IEEE Jnl. of Quantum Electronics, vQE-14 n4 p293-302 Apr 78 (No copies furnished by DTIC).

No abstract available.

AD-A075 649/4 Not available NTIS
Defence Research Establishment Valcartier (Quebec)
Transversely Excited Atmospheric CO2 Laser Radar with Heterodyne Detection,
J. M. Cruickshank. 7 Jun 78, 5p Rept no. DREV-REPRINT-4225
Availability: Pub. in Applied Optics, v18 n3 p290-293, 1 Feb 79 (No copies furnished by DTIC).

No abstract available.

AD-A075 784/9 PC **A06**/MF **A01**
Defense Intelligence Agency Washington Dc
Bibliography of Soviet Laser Developments, Number 38, November-December 1978.
Sep 79, 119p Rept no. DIA-DST-1740Z-006-79
See also AD-A072 356.

Coverage includes basic research on solid state, liquid, gas, and chemical lasers; components; nonlinear optics; spectroscopy of laser materials; ultrashort pulse generation; theoretical aspects of advanced lasers; and general laser theory. Laser applications are listed under biological effects; communications; beam propagation; computer technology; holography; laser-induced chemical reactions; measurement of laser parameters; laser measurement applications; laser-excited optical effects; beam-target interaction; and plasma generation and diagnostics.

AD-A075 896/1 Not available NTIS
Defence Research Establishment Valcartier (Quebec)
Passive Mode-Locking of a Large Volume TEA-CO2 Laser Using an Unstable Resonator Configuration,
P. Lavigne , J. Gilbert , and J. L. Lachambre. 10 Feb 75, 7p
See also AD-B004 653.
Availability: Pub. in Optics Communications, v14 n2 p194-199 Jun 75 (No copies furnished by DTIC).

No abstract available.

AD-A075 968/8 PC **A05**/MF **A01**
Army Missile Command Redstone Arsenal AL High Energy Laser and Research Lab
Nuclear Studies of a Uranium Metal-Metal Excimer Nuclear Laser/Reactor with Nuclear Light Bulb Design.
Technical rept.,
Dennis R. Womack, Bonnie McDaniel, and Thomas G. Miller. 17 Jul 78, 88p Rept no. DRSMI-H-78-8

Uranium metal may have the potential of forming a metal excimer with zinc, cadmium or mercury. Excimers are the most efficient electronic transition lasers known, and metal excimers have spectra in the visible wavelength regions. Metal excimers of interest are InZn (5308, 5626 augstroms), InCd (5544, 5760 augstroms), InHg (5226 augstroms), TlZn (4680, 6200 augstroms), TlCd (4672, 6400 A), and TlHg (4590, 6560 augstroms). A laser is proposed where uranium is both the pumping source, via fission fragments, and the lasant, via excimer formation (UZn, UCd, UHg) with output in the visible wavelengths. The metal excimers mentioned have not yet been made to lase. In this initial study, reactor physics calculations with the computer code ANISN, a multi-geometrym, one-dimensional Boltzmann neutron transport code, were made to examine different reactor configurations. The uranium is required to be in a vapor state, and therefore reactor design is based heavily on the Nuclear Light Bulb Engine. Dependent upon the density requirements (of uranium and mercury, for example) for transmitting laser light, the reactor options include lasers that are self-critical to lasers that require criticality drivers.

AD-A076 010/8 PC **A02**/MF **A01**
Defence Research Establishment Valcartier (Quebec)
Performance and Diagnostics of Lasers Initiated by the Reaction of NO with ClO2,
S. J. Arnold , K. D. Foster , and D. R. Snelling. Sep 79, 25p Rept no. DREV-R-4144/79
Abstract in French.

A purely chemical HCl laser employing transverse flow was operated with a maximum multiline output power of 13 W, which represents a chemical efficiency of 8.6% based on the total exothermicity of the pumping reaction. The required nonequilibrium concentration on Cl atoms was generated by the branched-chain reaction of NO with ClO2. Mass spectrometric and absorption spectroscopic measurements of species concentrations in the NO/ClO2 reaction system showed that the effectiveness of production of the branched chain decreased with increasing total pressure. (Author)

AD-A076 285/6 Not available NTIS
Texas Tech Univ Lubbock Dept of Chemistry
Picosecond Spectrocopic Studies of Spontaneous and Stimulated Emission in Organic Dye Molecules,
G. R. Fleming , A. E. W. Knight , J. M. Morris , R. J. Robbins , and G. W. Robinson. 8 Nov 76, 10p ARO-14470.3-C
Grants DAAG29-76-G-0289, DAAG29-77-G-0028
Availability: Pub. in Chemical Physics, v23 p61-70 1977 (No copies furnished by DTIC). Microfiche copies only.

No abstract available.

20F. Optics

AD-A075 643/7 Not available NTIS
Defence Research Establishment Valcartier (Quebec)
Simple, High-Resolution Laser Mirror Mount,
Paul W. Pace , and J. B. Atkinson. 9 Apr 76, 3p
Availability: Pub. in Review of Scientific Instruments, v47 n9 p1215-1216, 9 Sep 76 (No copies furnished by DTIC).

No abstract available.

AD-A075 648/6 Not available NTIS
Defence Research Establishment Valcartier (Quebec)
Off Beam Axis Scattering by Spherical Particles,
W. G. Tam. 21 May 77, 4p Rept no. DREV-REPRINT-4200
Availability: Pub. in Applied Optics, v16 n8 p2016-2018 Aug 77 (No copies furnished by DTIC).

No abstract available.

AD-A075 759/1 Not available NTIS
Defence Research Establishment Valcartier (Quebec)
Probability Distribution of Turbulent Irradiance in a Saturation Regime,
L. R. Bissonnette , and P. L. Wizinowich. 1 Nov 78, 11p DRB-REPRINT-4107
Availability: Pub. in Applied Optics, v18 n10 p1590-1599, 15 May 79 (No copies furnished by DTIC).

No abstract available.

AD-A075 796/3 Not available NTIS
National Research Council of Canada Ottawa (Ontario)
Extreme Errors of Numerical Integrations in Colorimetric Calculations,
Noboru Ohta , and Gunter Wyszecki. 12 Feb 75, 6p Rept no. NRC-14681
Availability: Pub. in Jnl. of The Optical Society of America, v65 n7 p834-838 Jul 75 (No copies furnished by DTIC).

No abstract available.

AD-A076 124/7 PC **A07/MF A01**
Avco Everett Research Lab Inc Everett Ma
Flameout and Acoustic Damping in Pulsed Chemical Lasers.
Final technical rept.,
R. Limpaecher. Jun 79, 149p
Contract N00173-76-C-0162, DARPA Order-3016

The objective of this program was to address the acoustic damping issue of a repetitively-pulsed atmospheric pressure pulsed chemical laser. For this purpose a device, one meter in size parallel to the optical axis, was designed and constructed. To achieve flameout 80 fluidic devices were used to control the hydrogen flow. A new mixer was fabricated to obtain the required medium quality using a photochemical machining technique. For the acoustic quieting a heat exchanger was used to reduce the acoustic reflection of the hot-cold gas interfaces, and a muffler type acoustic absorber was constructed for acoustic energy attenuation. The results of a limited test period have been described. (Author)

AD-A076 199/9 PC **A08/MF A01**
Photon Research Associates Inc La Jolla Ca
Development and Validation of Standardized Infrared Radiation Model (SIRRM). Gas/Particle Radiative Transfer Model.
Computer code development rept. 8 Sep 78-30 Jun 79,
G. N. Freeman , C. B. Ludwig , W. Malkmus , and R. Reed. 30 Oct 79, 171p AFRPL-TR-79-55
Contract F04611-78-C-0081
Prepared in cooperation with Grumman Aerospace Corp., Bethpage, NY.

Analytical models have been developed to treat the coupled gas/particle radiative transfer in exhaust plumes, monochromatically and in a band model approach. In addition, the availability of the particle optical parameters has been investigated. The requirements for the plume scattering model in SIRRM are: Coupled emission, absorption and scattering treatment; Multiple scattering with cylindrical geometry; Three-dimensional, non-uniform, axisymmetric medium; Arbitrary particle mixtures and size distribution; Line-by-line and band-model treatments; and Alternate levels of engineering approximation. These requirements are met by developing two basic approaches, a 6-flux and a N-flux approach. This distinction refers to the associated subdivision in angular space, six-orthogonal coordinates versus N nonorthogonal coordinates in azimuth and elevation, thus providing the alternatives of computational simplicity of the 6-flux model with generality of the N-flux model. Numerous parametric calculations were performed to study the effect of optical depth, scattering albedo, phase function and medium geometry on the target signature and computational requirements. (Author)

AD-A076 322/7 PC **A03/MF A01**
Arnold Engineering Development Center Arnold Afs TN
Experimental Studies of Multiple-Scattered Light from Latex Spheres.
Final rept. Oct 76-Nov 78,
D. P. Weaver , B. P. Curry , and J. W. L. Lewis. Oct 79, 30p Rept no. AEDC-TR-79-60
Prepared in cooperation with ARO, Inc., Tullahoma, TN.

This report presents the results of a series of light-scattering measurements on small, spherical particles of a known size distribution and index of refraction. The purpose of the study is to provide additional data for the evaluation of the multiple-scattering model used in a plume visibility code currently being developed for the Air Force. Measurements of both singly and multiple scattered laser radiation from aqueous suspensions of spherical latex particles were performed at several optical depths. Included are descriptions of the light-scattering apparatus and sample preparation techniques used in the study. Also, sample results of the experiments are presented in graphical form with normalized scattering intensity as a function of scattering angle. (Author)

CONF-790819-6 PC **A02/MF A01**
Oak Ridge National Lab., TN.
Pulsed Dye Laser OAS with a Helmholtz Resonator Cell.
R. W. Shaw. 1979, 10p
Contract W-7405-ENG-26
Topical meeting on photoacoustic spectroscopy, Ames, IA, USA, 1 Aug 1979.

A Helmholtz resonator cell for simplifying pulsed dye laser-excited optoacoustic signals is described and employed for high resolution OAS of holmium oxide powder. (ERA citation 04:055315)

COO-2723-3 PC **A02/MF A01**
Colorado State Univ., Fort Collins.
Exploratory Study of Metal Vapor Lasers Operating in the Ultra-Violet at Kilowatt Power Levels. Final Report, June 1, 1975—March 31, 1979.
G. J. Collins. Mar 79, 10p
Contract EY-76-S-02-2723

Cw laser action has been extended down to 220 nm. Moreover, cw oscillation has been obtained on twenty additional transitions in the spectral range between 220 and 320 nm. Ultra-violet laser thresholds as low as 2 A have been observed. In comparison, rare gas ion lasers require 20 to 50 A to reach threshold. Metals of interest are sputtered into the discharge giving metal densities of 10 exp 14 atoms cm exp -3 without using external ovens or discharge heating. Recent attempts to scale the output power levels to 1 W cw are presented with particular emphasis on the 780 nm transitions of Cu II and the 840 nm transitions of Ag II. (ERA citation 04:052077)

LA-7724-M PC **A02/MF A01**
Los Alamos Scientific Lab., NM.
QIKMIX: A Quick-Turnaround Computer Program for Computing Opacities of Mixtures.
J. Abdallah, Jr., and W. F. Huebner. May 79, 12p
Contract W-7405-ENG-36

QIKMIX is a quick-turnaround computer code developed to compute the radiative Rosseland mean opacity of specified mixtures at specified temperature and density points. The QIKLIB data base, which QIKMIX uses, has been derived from the OPLIB library. For most mixtures, QIKMIX can compute opacities over a temperature range of 50 to 25,000 eV in less than 1 min of CDC 7600 computer time. The purpose of this report is to discuss the QIKLIB data base and the operation of the QIKMIX code. (ERA citation 04:048965)

PAT-APPL-6-043 876 PC **A02/MF A01**
Department of the Army Washington DC
Active Optical Filter.
Patent Application,
L. Bobb. Filed 30 May 79, 10p AD-D006 403/0
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An active optical filter comprising a device which utilizes a phenomenon known as 'total internal reflection.' Two prisms are provided with a medium interposed between them. The index of refraction of the interposed medium is one which will change and decrease the light-transmitting properties of the filter with an increase in intensity of the incident light to form an optical switch which limits the transmitted light above certain power levels. These power levels are often found in Q-switched laser pulses. (Author)

PATENT-4 157 861 PC **A02/MF A01**
Department of the Navy Washington DC
Optical Beam Steering System.
Patent,
Kirk E. Davies. Filed 3 Aug 77, patented 12 Jun 79, 5p AD-D006 428/7, PAT-APPL-821 269
Supersedes PAT-APPL-821 269-77, AD-D004 373.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An optical beam steering system is provided by a reflective surface mounted on a baseplate which is electromagnetically driven by applied signals to control its angular disposition to a degree of accuracy within fractions of a microradian. Resilient means such as coil springs are attached in pairs to the baseplate to define two orthogonally related axes of movement intersecting at the geometric center of the baseplate. A pivotal support (preferably a jewel bearing) is positioned at the geometric center of the baseplate; first and second pairs of permanent magnets extend from the baseplate at opposite equidistant points from the pivotal support to define first and second axes of movement which are also orthogonally related. Associated pairs of electrically conductive coils are disposed around the permanent magnets and spaced therefrom to permit relative movement and a selectively variable electrical signal source is connected to the coils, preferably in push-pull arrangement, to generate electromotive forces which are transmitted to the baseplate for angularly positioning the baseplate and reflective surface about the first and second axes of movement. (Author)

PATENT-4 160 579 PC **A02/MF A01**
Department of the Navy Washington DC
Tapered Velocity Electro-Optical Waveguide Switch.
Patent,
A. Fenner Milton. Filed 3 May 78, patented 10 Jul 79, 4p AD-D006 431/1, PAT-APPL-896 075
Supersedes PAT-APPL-896 075-78, AD-D005 062.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This patent describes a four-part electro-optical switch for switching optical radiation from one waveguide to another. Parallel waveguides are embedded in the surface of a substrate and provided with separating ends for transmitting radiation through the waveguides. Curved electrodes on the outer side of each waveguide in cooperation with a central electrode and separate voltage sources change the electro-optic properties of the waveguide such that radiation may be switched from one waveguide to the other when the voltage source is in the 'on' state. (Author)

PATENT-4 164 363 PC **A02/MF A01**
Department of the Navy Washington DC
Single Mode Fiber-to-Channel Waveguide Through-Line Coupler.
Patent,
Hui-pin Hsu. Filed 19 Jan 78, patented 14 Aug 79, 4p AD-D006 435/2, PAT-APPL-870 774
Supersedes PAT-APPL-870 774-78.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This patent describes a single-mode optical fiber to a single-mode optical channel waveguide end-fire coupler. A single fiber held within a capillary tube and positioned by a micropositioner is adjusted for greatest light output and then secured by an epoxy to one end of a channel waveguide. The two elements are then secured in place in a slot in the capillary tube which prevents rotation of the waveguide relative to the single fiber. (Author)

PATENT-4 166 959 Not available NTIS
National Aeronautics and Space Administration. Pasadena Office, CA.
Multi-Channel Rotating Optical Interface for Data Transmission.
Patent,
C. V. Ivie. Filed 25 Aug 77, patented 4 Sep 79, 6p N79-34011/3, PAT-APPL-827 464
Supersedes PAT-APPL-827 464-77, N79-20496 (17 - 11 p 1447).
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

Apparatus for transmitting multiple channels of data across a rotating interface, such as between an antenna that rotates with respect to a platform, is described. Features of the apparatus include: (1) light emitter elements and light detector elements located on the two bodies that rotate relative to each other; (2) a lens for focusing light from each emitter element onto a corresponding detector element; and (3) an image rotating means which is turned as one of the objects rotates, to derotate the images of the emitter elements that are to be focused on the detector elements.

UCRL-83008 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Coherent Fiber Optics Test Techniques.
R. P. Reedy. 18 Jul 79, 35p CONF-790838-1
Contract W-7405-ENG-48
23. annual international symposium of the Society of Photographic Instrumentation Engineers, San Diego, CA, USA, 27 Aug 1979.

We have found that reliance on theoretical models or incomplete manufacturers data is not adequate for predicting the result of combining optical and electro-optical components into a system. The complete imaging characteristics of each component must be accurately known if reliable predictions are expected. Inhouse testing then is desirable where possible. Some components have well established evaluation procedures. Others such as coherent fiber optics, require various test techniques some well established and others must be devised if complete characterization is needed. This is especially true where changes in magnification are a feature of the bundle. A description of the techniques we use for testing the MTF, image rotation, magnification, image size variation, distortion, shear, transmission efficiency, transmission variation, transmission defects, flatness and acceptance angle are included in this paper. (ERA citation 04:050548)

20G. Particle Accelerators

AD-A076 200/5 PC **A03**/MF **A01**
Naval Research Lab Washington Dc
Generation of High Energy-High Current Ion Pulses by Magnetic Compression of Ion Rings.
Interim rept.,
C. A. Kapetanakos. 24 Oct 79, 34p NRL-MR-4093, AD-E000 333

A scheme is proposed for the generation of intense, high energy ion pulses by magnetic compression of ion rings. After compression the ring is extracted through a half magnetic cusp that transforms an appreciable fraction of the ring's rotational energy to translational energy. Using the Vlasov-Maxwell approach, it has been shown the existence of equilibrium of a hollow, rotating beam in the absence of an external magnetic field and a conducting guide tube. Therefore, the proposed scheme appears to be in particular useful for those applications that require a large separation between the accelerator and the target. (Author)

ANL-Trans-1167 PC **A03**/MF **A01**
Bonn Univ. (Germany, F.R.). Physikalisches Inst.
Development and Testing of an Induction Furnace for the Production of High-Temperature Vapors for Absorption Spectroscopy Studies.
E. R. Radtke. May 79, 48p
Contract W-31-109-ENG-38
C BONN-IR--75-13, April 1975.Thesis.

The two electron synchrotrons of Bonn are powerful sources of synchrotron radiation which is utilized by the Bonn Synchrotron Radiation Group in collaboration with the Imperial College of London for absorption experiments with gases and vapors. The vacuum uv region with wavelengths of 2000 A to about 10 A is of particular interest. This region contains the excitation and ionization energies of the inner electron shells. Absorption experiments are carried out with the quasi-continuum of synchrotron radiation as the background and an absorption cell between the synchrotron and spectroscope. The absorption cell consists of furnaces in which nongaseous elements can be vaporized. A measurement of photon absorption cross-sections in the order of 1 Mb = 10 exp -18 cm exp 2 , which may be considered typical, requires an integral particle density of integral N(s)ds approx. 10 exp 18 /cm exp 2 . With an approximately homogeneous density distribution and an absorption cell length X = 42 cm, a vapor pressure of 1 to 2 torr corresponds to this particle density. The resistance furnaces utilized thus far only allowed a determination of elements which have a vapor pressure of at least 1 torr at a temperature of 1000 exp 0 C. The objective of this study therefore is to develop an induction furnace with an efficiency of 80%, so that a 42 cm long furnace pipe can be heated to a temperature of about 2300 exp 0 C. Two problems must be solved: (1) It is necessary to investigate theoretically how the efficiency of an induction furnace of finite length can be maximized, since the results known from literature are incorrect. (2) Using the theoretical findings, the induction furnace must be constructed and tested. (ERA citation 04:050485)

ANL-78-XX-68 PC **A14**/MF **A01**
Argonne National Lab., IL.
ATLAS: A Proposal for a Precision Heavy Ion Accelerator at Argonne National Laboratory.
Feb 78, 302p
Contract W-31-109-ENG-38

The objective of the proposed Argonne Tandem-Linac Accelerator System (ATLAS) is to provide precision beams of heavy ions for nuclear physics research in the region of projectile energies comparable to nuclear binding energies (5-25 MeV/A). By using the demonstrated potential of superconducting rf technology, beams of exceptional quality and flexibility can be obtained. The system is designed to provide beams with tandem-like energy resolution and ease of energy variation, the energy range is comparable to that of a approx. 50 MV tandem and, in addition, the beam will be bunched into very short (approx. 50 psec) pulses, permitting fast-timing measurements that can open up major new experimental approaches. (ERA citation 04:050465)

BNL-26412 PC **A03**/MF **A01**
Brookhaven National Lab., Upton, NY.
Accelerators and Storage Ring.
Y. Y. Lee. 1979, 38p CONF-790744-1
Contract EY-76-C-02-0016
Workshop on high energy experiments in Korea, Seoul, Republic of Korea, 23 Jul 1979.

The high energy accelerators are proven to be a very useful tool not only for high energy physics, but also for the whole field of physics as well as other scientific fields. Possible accelerators both for electron or positron and proton accelerator schemes are discussed, and rudimentary theory behind the accelerators and the technology required for the construction of the accelerator are described. The advantages and disadvantages of the accelerators are presented. The choice of the accelerator (electron-positron or proton, energy, intensity) is of course made by physics priority, technical availability, usefulness to other fields and economic considerations. (ERA citation 04:053557)

CONF-790610-4 PC **A02**/MF **A01**
Massachusetts Univ., Amherst. Dept. of Physics and Astronomy.
Characteristics and Performance of a New Magnet System for 180 exp 0 Electron Scattering.
G. A. Peterson. 1979, 6p
Contract EY-76-S-02-2853
International conference on nuclear physics with electromagnetic interactions, Mainz, F.R. Germany, 5 Jun 1979.

A four-magnet 180 exp 0 scattering system for use with the energy-dispersed beam of the 400 MeV Bates Linear Accelerator at the University of Massachusetts is described. (ERA citation 04:055440)

CONF-790728-1 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Heavy Ion Target Area Fast Neutron Dose Equivalent Rates.
W. F. Ohnesorge, H. M. Butler, C. B. Fulmer, and S. W. Mosko. 1979, 9p
Contract W-7405-ENG-26
24. annual meeting of the Health Physics Society, Philadelphia, PA, USA, 7 Jul 1979.

Fast neutron dose equivalent rates were measured for targets bombarded with a variety of heavy-ion beams over a wide range of energies. These data should be useful to those developing policies which allow personnel to enter accelerator areas during beam on periods. (ERA citation 04:050481)

EUR-5908 PC **A03**/MF **A01**
Commission of the European Communities, Petten (Netherlands). Joint Nuclear Research Center.
Ultra-High Vacuum Target Assembly for Charged Particle Irradiations in the Materials Research Field.
J. Bressers, G. Cassanelli, R. de Cat, H. Kohnen, and G. Gherardi. 1978, 38p
U.S. Sales Only.

A target assembly designed for ion irradiation and ion implantation experiments on different particle accelerators is described. It consists of a target chamber separated from the beam line by a thin metal window, thus allowing implantations to be carried out under ultra-high vacuum conditions. Homogeneous in-depth distribution of the implanted ion species is realized by rotating the target about an axis perpendicular to the ion beam (rocking). The target holder is driven by means of a stepping motor with a constant step angle and a rocking device controller containing the required rocking angle-dwell time relation. Ion beam homogeneity over a sufficiently large target area is arrived at by transforming the Gaussian beam intensity profile into a flat beam intensity distribution by means of an electrostatic ring lens. The beam intensity profile is monitored by means of a specially designed ion beam monitor based on the Nipkov disc principle. A toroidal beam current monitoring transformer continuously measures the total beam current. Beam scanners and current measuring collimators complete the beam analyzing equipment. (Atomindex citation 10:452564)

IAE-2942 PC **A03**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
Isochronous Cyclotron.
N. I. Venikov, A. G. Volkovich, and A. N. Gushchin. 1978, 36p
In Russian.
U.S. Sales Only.

To improve the beam parameters on the targets and to increase the possibilities of physical experiments the reconstruction of a 1.5-m isochronous cyclotron with deep regulation of ion energy was carried out. The description of the main cyclotron systems is given: electric power sypply and control, the extraction and the beam transport, rf, vacuum, watercooling and diagnostics. The maximum frequency of the accelerating voltage was 20 MHz. For measurement of spatial and timing distributions of ion beam intensity, electric probe capacitive pick-up electrodes and scintillators of beryllium oxide are used. As a result of modification on the isochronous cyclotron produced were the beams of multi-charged ions were produced (with beam current in mu A): exp 6 Li exp 3+ - 2; exp 7 Li exp 3+ - 2; exp 9 Be exp 3+ - 2; exp 12 C exp 4+ - 30; exp 14 N exp 5+ - 13; exp 16 O exp 6+ - 1. The possibility of cyclotron use for time-of-flight spectrometry of fast neutrons is shown. (Atomindex citation 10:452635)

IFVE-OEF-78-98 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Proton Beam for the FODS - Focusing Two-Shoulder Spectrometer.
A. V. Alekseev, A. S. Dyshkant, V. M. Tatarenko, and V. N. Chepegin. 1978, 11p
In Russian.
U.S. Sales Only.

For optimization of operation of the IFVE accelerator channels the extraction of the proton beam with momentum (69.3+-0.2) GeV/c and 6 x 10 exp 7 protons per cycle on the target of the FODS-focusing two-shoulder spectrometer is carried out. The scattering angle of the extracted beam was minimized by chosing a special form of local distortion of the proton orbit in the accelerator with the help of additional windings placed on four magnet blocks. One of the regimes of the optimal focusing for diffractional protons was calculated and tested. The system of slow extraction of the accelerated proton beam has provided the possibility of simultaneous operation of two channels under optimal conditions with one internal target of the accelerator. The efficiency of using beam intensity incident on the target increased by a factor of two. (Atomindex citation 10:452549)

IFVE-OUNK-78-69 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Devices to Improve Beam Structure in Slow Extraction from the IHEP 70 GeV Accelerator.
N. M. Veretennikov, V. K. Vorob'ev, A. V. Levin, L. L. Moizhes, and A. A. Cherepakhin. 1978, 15p

In Russian.
U.S. Sales Only.

To obtain uniform extraction of protons with a pulse duration up to 2s, devices for automatic adjustment of the timing structure of the beam in the frequencies of 50-150 Hz are developed and experimentally studied. Improvements of an active filter of the accelerator magnetic field and devices for reduction of beam modulations are described. The increase of the coefficients of pulsation suppression by several times in the frequencies of 50 and 100 Hz is achieved by means of active resonance RC filters included in the frequency correction circuits. The technique of parametric compensation of beam modulations present in the field pulsation signal emission in the frequency of 150 Hz by a band filter is described. The description of the guidance system with respect to the resonance of betatron oscillations and the adjustment of beam modulations is given. Beam intensity feedback is used in the system. Improvement of rectangular shape of the pulse was achieved by the use of amplifier with variable amplification factor, depending on the beam transmission coefficient. (Atomindex citation 10:452636)

ITEF-29(1978) PC **A04**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Teoreticheskoi i Eksperimental'noi Fiziki.
Project of Initial Beam Slow Extraction from the ITEP Reconstructed Accelerator.
A. E. Bol'shakov, M. A. Veselov, Yu. G. Globenko, L. L. Gol'din, and V. P. Zavodov. 1978, 55p
In Russian.
U.S. Sales Only.

To reduce magnetic field pulsations the problems related to particle slow extraction from the ITEP proton synchrotron using the nonlinear resonance Q/sub r/ = 9.33 are considered. Two versions of particle extraction on resonances Q/sub r/ = 9.33 and Q/sub r/ = 9.67 for compensation of nonlinear effects and dependence of betatron oscillation frequency spread upon their amplitude are suggested. The main characteristics of the accelerator, correcting circuits and elements of the system of slow extraction are presented for Q/sub r/ = 9.67. Using an electrostatic septum has been shown to permit reduction of the force of resonance disturbance and the value of orbit local distortion. (Atomindex citation 10:452563)

ITEF-57(1978) PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Teoreticheskoi i Eksperimental'noi Fiziki.
Rig for Testing Cold Cathodes.
E. N. Danil'tsev, and V. I. Pershin. 1978, 25p
In Russian.
U.S. Sales Only.

A rig is described for testing various types of cold cathodes with 1 cm exp 2 area at 600 A total current, intended for use in the linear induction accelerator LIU-5/5000, which is an injector of facility for investigation of the collective acceleration method. The rig consists of an electron gun, nanosecond pulse generator, pumping system and beam monitors. Voltage pulses with a 100-120 kV amplitude and 35 ns duration were generated by adouble shaping line (DSL), made of 9 cables connected in parallel. The pulses from the DSL were fed in the gun vacuum diode through the transformer-inductor section, increasing the voltage. It is shown that rig is reliable in operation and that the quick replacement is possible in case of cable failure. (Atomindex citation 10:452579)

LA-tr-79-18 PC **A03**/MF **A01**
European Organization for Nuclear Research, Geneva (Switzerland).
Calculation of Quadripolar Focusing of a Linear Accelerator and of Beam Adaptation in the Presence of a Space Charge.
B. Bru. 1979, 42p
Contract W-7405-ENG-36
CMPS/LIN/70-10, November 5, 1970.

This study concerns the determination of the focusing structure of a proton linear accelerator (as well as the beam parameters adapted to this structure) in the presence of space charge forces. In the method used, the beam is likened to a uniformly charged ellipsoid, and the space charge forces are calculated as a function of its three dimensions. (ERA citation 04:053554)

LA-tr-79-19 PC **A03**/MF **A01**
Akademiya Nauk URSR, Kharkov. Fiziko-Tekhnicheskii Inst.
Particle Dynamics in an Ion Linear Accelerator Operating in Double Frequency Regime.
V. A. Bomko, V. I. Volkov, Yu. V. Meleshkova, and N. A. Khizhnyak. 1979, 34p
Contract W-7405-ENG-36
C KhFTI--77-40, 1977.

The results of a series of studies of particle dynamics in an accelerator of the resonator type with drift tubes under simultaneous excitation of waves with a longitudinal electric field component on the axis of the cavity are given. The goal was to determine the optimum characteristics of these waves to maximize the monoenergetic character of the accelerated beam without deterioration of its other parameters. (ERA citation 04:053555)

LA-tr-79-21 PC **A02**/MF **A01**
CEA, Paris (France).
Saturn II Alignment Principles.
M. Poullain. 1979, 12p
Contract W-7405-ENG-36
C GERMA 75.06/GEO-01, January 14, 1975.

The principles used for the installation, alignment, and alignment monitoring of the Saturn II accelerator are described. (ERA citation 04:053566)

LBL-9182 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Minus 3: A General Purpose Data Acquisition System at LBL'S 88"-Cyclotron and Superhilac.
C. Maples, and J. Sivak. May 79, 9p CONF-790549-15
Contract W-7405-ENG-48
Conference on computerized data - acquisition systems in particle and nuclear physics, Santa Fe, NM, USA, 14 May 1979.

MINUS 3 is a general, multi-tasked data acquisition package operating on the ModComp IV/25 computers at both the 88"-Cyclotron and SuperHILAC. It currently can acquire data via three different channels: interrupt; serial DMA link; and remote slave units for histogram type data. Two additional acquisition paths, CAMAC (with programmable differential branch drivers) and MODACS (for multiple CPU linkages and control) are scheduled to be added in the near future. The package operates in a prioritized, time-available mode which permits it to dynamically adapt to microscopic data rate structures due to beam characteristics at different accelerators. Special hardware has been added to the graphics system to provide enhanced high-speed interactive capability. The program framework is also designed as a parasitic environment in which users may, in parallel, attach their own specialized and independent code. (ERA citation 04:050484)

SLAC-PUB-2320 PC **A03**/MF **A01**
Stanford Linear Accelerator Center, CA.
Experiments on the Beam--Beam Effect in E exp + E exp - Storage Rings.
H. Wiedemann. May 79, 29p PEP-NOTE-299, CONF-790318-5
Contract EY-76-C-03-0515
Symposium on nonlinear dynamics and the beam-beam interaction, Upton, NY, USA, 19 Mar 1979.

The maximum luminosity in a positron electron storage ring is fundamentally limited by the beam--beam effect. This is the perturbing effect of the electromagnetic field of one beam on the trajectory of every single particle of the other beam. The electromagnetic field of a charged particle beam is highly nonlinear. At a large distance from the beam center the field falls off like the inverse of the distance. Right in the center of the beam where we have a more or less uniform density distribution over a limited region the field rises linear with the distance from the center. So the field rises from the center of the beam, saturates at some distance and going further out falls off again as 1/r. The amplitude of the field depends on the charge density as well as the aspect ratio of the beam. If the electromagnetic field of one beam gets too large, particles of the other beam get lost which leads to a reduced beam lifetime. This effect has been observed in all electron--positron or electron--electron storage rings built so far and is considered the fundamental limit of the performance of electron--positron storage rings. Over the years many measurements have been performed at various laboratories to find the maximum permissible perturbation and the parametric dependence of that perturbation. In this paper, new measurements performed at SPEAR are presented and compared with measurements from ACO, ADONE, and VEEP-2M. Results from other storage rings have been ignored because they either show lower permissible perturbations or because of insufficient published data. (ERA citation 04:049070)

UCRL-81860 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
RTNS-II Neutron Sources: Status Report.
J. C. Davis, D. W. Heikkinen, J. L. Heid, C. M. Logan, and J. E. Osher. Mar 79, 4p CONF-790327-155
Contract W-7405-ENG-48
IEEE particle accelerator conference, San Francisco, CA, USA, 12 Mar 1979.

Experience with neutron sources consisting of air-insulated 400 kV deuteron accelerators and tritium targets which rotate at 5000 rpm is reported. These accelerators are part of the Rotating Target Neutron Source-II (RTNS-II) facility. A review of the accelerator design is given. Operation of the prototype accelerator using hydrogen beams is discussed in detail. The parameters are tabulated for the first accelerator operated as a neutron source in November, 1978. Additional terminal pumping has reduced the radiation level from bremsstrahlung by at least a factor of ten. Ion source performance with deuterium has not been as good as that obtained with hydrogen. Beam divergence at the acceleration column exit is also observed. Future efforts include the fabrication of large diameter targets and design changes to improve source operation. (ERA citation 04:052391)

20H. Particle Physics

AD-A075 950/6 PC **A02**/MF **A01**
Tennessee Univ Knoxville
Trip Report 7902, October 1979,
I. A. Sellin. Oct 79, 8p Rept no. 7902
Contract N00014-75-C-0474
Report on project entitled Structure of Highly Ionized Heavy Ions and Associated Collision Phenomena in the MeV/nucleon Range.

This document is a trip report associated with work performed on the project entitled Structure of Highly Ionized Heavy Ions and Associated Collision Phenomena in the MeV/nucleon Range. (Author)

AD-A075 951/4 PC **A02**/MF **A01**
Tennessee Univ Knoxville
Summary Questionnaire Response 7901, October 1979.
Progress summary rept. Nov 78-Oct 79,
I. A. Sellin. Oct 79, 14p Rept no. 7901
Contract N00014-75-C-0474
Report on project entitled Structure of Highly Ionized Heavy Ions and Associated Collision Phenomena in the MeV/nucleon Range.

This document is an annual summary questionnaire response associated with work performed on the project entitled 'Structure of Highly Ionized Heavy Ions and Associated Collision Phenomena in the MeV/nucleon Range.' (Author)

AERE-R-9195 PC **A02**/MF **A01**
UKAEA, Harwell (England). Atomic Energy Research Establishment.
Neutron Yields from (Alpha ,N) Reactions in the Light Elements.
D. West, and A. C. Sherwood. Jul 78, 10p
U.S. Sales Only.

The need for more experimental data on thick target yields of neutrons from (alpha ,n) reactions in the light elements is noted and the areas of nuclear technology to which they are relevant are

mentioned. The design and construction of equipment for measuring neutron yields independently of neutron energy is described. It consists of an effectively infinite polythene moderator in which simultaneous measurements of neutron intensity by nine long He exp 3 -Ar-Methane filled counters, placed at a range of radii, enable a spatial integral of the thermal neutron density to be obtained throughout the moderator. Results of the first measurements using the technique are presented for Al, Mg, C, Si, Fe and UO sub 2 over the He exp 4 particle energy range 3.6 to 8.0 MeV. (Atomindex citation 10:422761)

ANL-78-66 PC **A13**/MF **A01**
Argonne National Lab., IL.
Study of High Spin Isomeric States Near the Closed Neutron Shell.
T. L. Khoo, R. K. Smither, R. Andrews, B. Haas, and O. Hauesser. 1978, 276p

Sn and Te targets were bombarded with exp 32 S beams. gamma multiplicity, isomer energy, and isomer spin are tabulated. A plot E vs I(I+1) for the yrast states of exp 152 Dy is also shown. On average, E = E sub 0 + (h-bar 2/2 script-I)I(I+1). The spin of the highest-lying state is 37 h-bar. 1 figure, 1 table. (ERA citation 04:053847)

BNL-26444 PC **A02**/MF **A01**
Pennsylvania Univ., Philadelphia.
Cosmological Limits on the Existence of Possible Stable Heavy Hadrons.
C. B. Dover, T. K. Gaisser, and G. Steigman. 1979, 14p CONF-790836-2
Contract EY-76-C-02-0016
16. international cosmic rays conference, Kyoto, Japan, 6 Aug 1979.

With regard to cosmological limits on the existence of possible stable heavy hadrons, it is considered what are the quantum numbers of the least massive hadrons which can be formed with the new quarks (stable quarks with lifetime on the scale of 4(10) exp 9 years), the possible binding of these heavy new hadrons to single nucleons, forming a system analogous to the deuteron. The approximate binding energy of a new hadron to a heavy nucleus, possible predictions for the abundance of such objects, and what experiments would be most likely to reveal their presence and what are the current experimental limits on the abundance of such nuclei are also treated. 13 references. (ERA citation 04:050722)

BNL-26483 PC **A02**/MF **A01**
Columbia Univ., New York.
Confirmation of the Existence of the sigma / sub C/ exp ++ and lambda /sub C/ exp + Charmed Baryons.
C. Baltay, D. Caroumbalis, and H. French. 1979, 8p CONF-790648-5
Contract EY-76-C-02-0016
Neutrino 1979 conference, Bergen, Norway, 18 Jun 1979.

In a broad-band neutrino exposure of the Fermilab 15-ft. bubble chamber, the production of the sigma /sub c/ exp ++ (2426) charmed baryon followed by its decay to lambda /sub /c exp + (2260) and pi exp + was observed. The mass of the lambda / sub c/ exp + was found to be (2257 +- 10) MeV and the m(sigma /sub c/ exp ++) - m(lambda / sub c/ exp +) mass difference to be (168 +- 3) MeV. Previously unseen two body decay modes of the lambda /sub c/ exp + (2260) are observed. 15 references. (ERA citation 04:053802)

BNL-26547 PC **A03**/MF **A01**
Brookhaven National Lab., Upton, NY.
Projectile Rapidity Dependence in Target Fragmentation.
P. E. Haustein, J. B. Cumming, and H. C. Hseuh. 1979, 28p CONF-790743-4
Contract EY-76-C-02-0016
Symposium on heavy ion physics from 10-200 MeV/A, Upton, NY, USA, 16 Jul 1979.

The thick-target, thick-catcher technique was used to determine mean kinetic properties of selected products of the fragmentation of Cu by exp 1 H, exp 4 He, and exp 12 C ions (180 to 28,000 MeV/amu). Momentum transfer, as inferred from F/B ratios, is ovserved to occur most efficiently for the lower velocity projectiles. Recoil properties of target fragments vary strongly with product mass, but show only a weak dependence on projectile type. The projectile's rapidity is shown to be a useful variable for quantitative intercomparison of different reactions. These results indicate that E/ sub proj//A/sub proj/ is the dominant parameter which governs the mean recoil behavior of target fragments. 20 references. (ERA citation 04:053803)

BNL-50847 PC **A16**/MF **A01**
Brookhaven National Lab., Upton, NY.
Proceedings of the Isotope Separator on-Line Workshop.
R. E. Chrien. Jul 78, 374p CONF-771078-
Contract EY-76-C-02-0016
Workshop on ISOL systems, Upton, NY, USA, 31 Oct 1977.

Separate abstracts were prepared for thirteen of the papers in this volume. The remaining three have already been cited in ERA, and can be located by reference to the entry CONF-771078-- in the Report Number Index. (ERA citation 04:055685)

CONF-790545-3 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Classical Transcription of the TDHF Approximation.
C. Y. Wong. 1979, 8p
Contract W-7405-ENG-26
Time-dependent Hartree-Fock international workshop, Gif-sur-Yvette, France, 28 May 1979.

The time-dependent Hartree--Fock approximation is shown to be approximately equivalent to a purely classical pseudoparticle simulation. In this simulation, a collection of pseudoparticles are introduced to discretize the phase space of spatial and momentum coordinates. The dynamics is completely determined by following the pseudoparticle trajectories which are the same as the trajectories of real particles moving in the self-consistent field. An application of these concepts to nearly-head-on heavy-ion collisions leads to a better understanding of the origin of the low-l fusion window obtained in the TDHF calculations. 1 table. (ERA citation 04:049346)

CONF-790610-5 PC **A02**/MF **A01**
Argonne National Lab., IL.
Photon Scattering by the Giant Dipole Resonance.
T. J. Bowles, R. J. Holt, H. E. Jackson, R. D. McKeown, and J. R. Specht. 1979, 25p
Contract W-31-109-ENG-38
International conference on nuclear physics with electromagnetic interactions, Mainz, F.R. Germany, 5 Jun 1979.

Although many features of the giant dipole resonance are well known, the coupling between the basic dipole oscillation and other nuclear collective degrees of freedom such as surface vibrations and rotations is poorly understood. This aspect was investigated by elastic and inelastic bremsstrahlung scattering of tagged photons over the energy range 15 to 22 MeV. Target nuclei were exp 60 Ni, exp 52 Cr, exp 56 Fe, exp 92 Mo, and exp 96 Mo. Scattering and absorption cross sections are tabulated, along with parameters obtained from a two-Lorentzian analysis of the scattering cross sections; measured spectra are shown. It was necessary to remove Thomson scattering from the experimental results. It was found that coupling to surface vibrations in the giant dipole resonance is much weaker than the dynamic collective model suggests. The elastic scattering cross section for all targets but exp 60 Ni showed structure that is not evident in the absorption cross section measurement. 12 figures, 2 tables. (ERA citation 04:053838)

CONF-790847-2 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Center for Theoretical Physics.
Heavy Quark--Antiquark Bound States in the Framework of Quantum Chromodynamics.
R. D. Viollier, and J. Rafelski. Jun 79, 35p
Contract EY-76-C-02-3069
International conference on high energy physics and nuclear structure, Vancouver, Canada, 13 Aug 1979.

Based on the first order running coupling constant alpha /sub lambda /(q exp 2) a quark-antiquark potential is derived in the static limit. The tachyon pole in alpha /sub lambda /(q exp 2) leads to a partially confining potential, while the smooth remainder gives rise to a Coulomb like interaction. Linear confinement is imposed by extrapolating the confining potential linearly for distances r > r sub 0 . Thus, aside from the quark masses, m/sub c/ and m/sub b/, the model contains two free parameters: the renormalization mass lambda , and the extrapolation radius r sub 0 . With lambda = 441 MeV, r sub 0 = .378 fm, m/sub c/ = 1.525 GeV, and m/sub b/ = 4.929 GeV the observed orthocharmonium and orthobottomium spectrum are reproduced very well. This can be viewed as evidence for the validity of the framework of quantum chromodynamics. 32 references. (ERA citation 04:053806)

COO-1167-42 PC **A02**/MF **A01**
Chicago Univ., IL. Enrico Fermi Inst.
Nuclear Chemistry Research. Final Report.
N. Sugarman. 1979, 20p
Contract EY-76-S-02-1167

Research on the mechanism by which a radioactive nucleus is produced from the interaction of a projectile with a complex nucleus in terms of the primary interaction of the projectile with a nucleon or cluster of nucleons is summarized. A list of major accomplishments and one of publications are included. (ERA citation 04:053810)

COO-1195-411 PC **A13**/MF **A01**
Illinois Univ., Urbana. Dept. of Physics.
Hadron Production in High Energy Muon Scattering.
R. G. Hicks. 1978, 289p
Contract EY-76-C-02-1195
Thesis.

An experiment was performed to study muon-proton scattering at an incident energy of 225 GeV and a total effective flux of 4.3 x 10 exp 10 muons. This experiment is able to detect charged particles in coincidence with the scattered muon in the forward hemisphere, and results are reported for the neutral strange particles K/sub s/ exp 0 and lambda exp 0 decaying into two charged particles. Within experimental limits the masses and lifetimes of these particles are consistent with previous measurements. The distribution of hadrons produced in muon scattering is determined, measuring momentum components parallel and transverse to the virtual photon direction, and these distributions are compared to other high energy experiments involving the scattering of pions, protons, and neutrinos from protons. Structure functions for hadron production and particle ratios are calculated. No azimuthal dependence is observed, and lambda production does not appear to be polarized. The physical significance of the results is discussed within the framework of the quark-parton model. 29 references. (ERA citation 04:053800)

COO-1195-443 PC **A07**/MF **A01**
Illinois Univ., Urbana. Dept. of Physics.
Study of Zweig's Rule Using phi Mesons in a Broad Band Neutral Beam.
M. C. Goodman. 1979, 128p
Contract EY-76-C-02-1195
Thesis.

A study of Zweig's rule using phi mesons in a high energy photon beam was performed. Measurement of the ratio sigma(gamma A implies phi pi pi A)/sigma(gamma A implies omega pi pi A) = 0.10 +- 0.02 is taken as evidence that there is not as strong suppression as could be expected. Other ratios show strange particle production down from nonstrange particle production by a factor of twelve. Decays involving phi mesons are studied, and the only candidate seen is a four sigma effect in the mode two phis with a mass 2.15 GeV. F meson, charm pseudo-scalar meson and exotic vector mesons which might decay into phis are not seen. The phi prime is not seen with an upper limit sigma(gamma A implies phi'A)B(phi' implies K exp + K exp - pi exp + pi exp -) < 6 nb per nucleon. (ERA citation 04:053805)

COO-1545-253 PC **A03**/MF **A01**
Ohio State Univ. Research Foundation, Columbus.

Four-Year Summary of the Research Effort of the High Energy Physics Group at the Ohio State University, 1973--1977.
1978, 36p
Contract EY-76-C-02-1545

Experimental and theoretical high energy physics is summarized. Lists of proposed experiments and publications are included. (ERA citation 04:053798)

COO-1545-255 PC **A02**/MF **A01**
Ohio State Univ., Columbus. Dept. of Physics.
Jet Angular Distribution from Quantum Chromodynamics.
S. Nandi, and W. W. Wada. 27 Jun 79, 18p
Contract EY-76-C-02-1545

The quantum chromodynamic correction to jet (defined a la Sterman and Weinberg) angular distribution in energetic e exp + e exp - annihilation is calculated to order alpha /sub s/ keeping exact dependence on epsilon and delta. Deviations from the zeroth order distribution, 1 + cos exp 2 theta, for are found relatively large values of epsilon and delta. This effect could be tested at the existing e exp + e exp - colliding beam facilities. (ERA citation 04:050709)

COO-1545-256 PC **A02**/MF **A01**
Ohio State Univ., Columbus. Dept. of Physics.
SU(N) Grand Unification with Several Quark--Lepton Generations.
P. H. Frampton. 1979, 7p
Contract EY-76-C-02-1545

Procedures are given for embedding SU(5) into SU(N) such that several SU(5) generations remain as ordinary-mass fermions. Examples with an arbitrary number of generations occur already for SU(7). All models have only quarks and leptons, without quixes or quaights. (ERA citation 04:050735)

COO-1764-353 PC **A02**/MF **A01**
Minnesota Univ., Minneapolis. School of Physics and Astronomy.
String Flip-Flop and Quark Matter.
H. Miyazawa. 23p
Contract EY-76-C-02-1764

Quarks are bound by strings attached to them. When two strings come close, a rearrangement of connections takes place. This effect plays an important role in a dense ensemble of quarks, quark matter. A phase transition from nuclear matter to quark matter occurs at the nucleon density rho < 5 rho sub 0 where rho sub 0 is the density of the ordinary nuclear matter. The string flip-flop causes a new type of attractive interaction between hadrons at short distances or among quarks at high density. This interaction can produce multiquark bound states such as dibaryon or dimeson resonant states. 8 references. (ERA citation 04:053808)

COO-2232B-172 PC **A03**/MF **A01**
Rockefeller Univ., New York.
Report of Technical Progress under the Current DOE Contract, EY-76-C-02-2232. *000B. Progress Report, February 1, 1978--February 1, 1979.
M. A. B. Beg, N. N. Khuri, and A. Pais. 1979, 30p
Contract EY-76-C-02-2232

Research in theoretical and experimental high energy physics is summarized. A list of publications is included. (ERA citation 04:053799)

COO-2479-16 PC **A02**/MF **A01**
Rensselaer Polytechnic Inst., Troy, NY.
Neutron Cross Section Measurements for the Fast Breeder Program.
R. C. Block. Jun 79, 8p
Contract EY-76-S-02-2479

This research was concerned with the measurement of neutron cross sections of importance to the Fast Breeder Reactor. The capture and total cross sections of fission products (exp 101 exp 102 exp 104 Ru, exp 143 exp 145 Nd, exp 149 Sm, exp 95 exp 97 Mo, Cs, Pr, Pd, exp 107 Pd, exp 99 Tc) and tag gases (Kr, exp 78 exp 80 Kr) were measured up to 100 keV. Filtered neutron beams were used to measure the capture cross section of exp 238 U (with an Fe filter) and the total cross section of Na (with a Na filter). A radioactive neutron capture detector was developed. A list of publications is included. (ERA citation 04:053845)

COO-2696-007 PC **A02**/MF **A01**
Denison Univ., Granville, OH.
Determination of Neutron Cross Sections and Resonance Parameters for the Stable Tellurium Isotopes for Thallium 205 and for the Osmium Isotopes. Progress Report, October 1, 1978-March 1, 1979.
R. R. Winters. 9 Mar 79, 13p
Contract EY-76-S-02-2696

Initial measurements by LLL and NBS of the ratio of the exp 186 Os capture cross section to that of exp 187 Os near 30 keV, provided a crucial input parameter for use of the Re-Os chronometer to estimate the duration of nucleosynthesis and hence the age of the universe. The resulting estimate of approx. = 20 billion years was much longer than the estimate from the only other method, U-Th dating. The Re-Os chronometer requires, however, not ratios of cross sections measured at laboratory temperatures, but rather the ratio appropriate to the stellar environment in which nucleosynthesis by the s-process occurs. Hence capture from low lying excited states is important. The capture cross section from the 9.75 keV first excited exp 187 Os state must be calculated using Hauser--Feshbach calculations. These calculations require estimates of level densities, neutron transmission functions (for ground and excited states) and radiative transmission functions. These calculations can be experimentally checked by measurements of the total and inelastic cross sections near threshold. The inelastic experiment is particularly difficult because of the requirement of low background and relatively high efficiency for detection of approx. = 30 keV neutrons. A proton-recoil detector has been developed which appears to provide adequate efficiency and energy resolution. A novel filter composed of alternate layers of iron, aluminum and air has been designed to eliminate neutrons other than those in the 25 keV Fe and Al window. Major problems in background reduction persist and might be helped with a sample of exp 187 Os of isotopic greater than that of the presently available 70% exp 187 Os sample. (ERA citation 04:053848)

COO-3000-T1 PC **A09**/MF **A01**
Massachusetts Inst. of Tech., Cambridge.
Neutral Particle Production in Diffractive Pion--Proton and Proton--Proton Interactions at 147 GeV/C.
A. Napier. 4 May 79, 184p
Contract EY-76-C-02-3000
Thesis.

A 273,000 picture exposure of the Fermilab 30-Inch Hybrid Bubble Chamber Spectrometer was made to study pi exp + , K exp + , and proton collisions with a proton target. A prototype lead glass gamma detector was used to determine energy and production angles of forward gamma rays and neutral pions. Single particle pi exp 0 distributions were compared with pi /sup +-/ distributions in pi exp + -proton and proton--proton events. Production of fast pi exp 0 and pi exp - in the proton beam was strongly suppressed relative to that observed in the pi exp + beam. Production of rho exp 0 and rho exp + , associated with the pi exp + beam, contributes to this effect. A sample of leading particle events was isolated by a selection procedure based on the kinematical configuration of all charged particles in the event. Cross sections, charge multiplicity distributions, and single particle distributions were obtained. The leading particle cross sections are predominantly diffractive, however, a decrease at higher energies is expected, due to PPR contributions in the context of a triple-Regge model. 71 references. (ERA citation 04:050698)

COO-3069-655 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Cambridge.
Bifurcation and Stability in Yang-Mills Theory with Sources.
R. Jackiw. Jun 79, 48p
Contract EY-76-C-02-3069

A lecture is presented in which some recent work on solutions to classical Yang-Mills theory is discussed. The investigations summarized include the field equations with static, external sources. A pattern allowing a comprehensive description of the solutions and stability in dynamical systems are covered. A list of open questions and problems for further research is given. 20 references. (ERA citation 04:053813)

COO-3069-677 PC **A18**/MF **A01**
Massachusetts Inst. of Tech., Cambridge.
Proceedings of the June Workshop in Intermediate Energy Electromagnetic Interactions with Nuclei, Held at MIT, June 13-24, 1977.
A. M. Bernstein. 1977, 417p
Contract EY-76-C-02-3069

Separate abstracts were prepared for the 22 papers presented. (ERA citation 04:055718)

COO-3071-240 PC **A02**/MF **A01**
Pennsylvania Univ., Philadelphia. Dept. of Physics.
Comparison of Neutrino Data on Average Values of Structure Function and Quark-Parton Model Parameters.
A. K. Mann. 1979, 22p CONF-790365-7
Contract EY-76-C-02-3071
16. rencontre de moriond, Les Arcs, Savoie, France, 17 Mar 1979.

A brief survey of inelastic neutrino and antineutrino interactions is presented which exhibits the growing internal consistency of the experimental data on structure function and QPM parameters averaged over the energy interval from about 20 to 200 GeV, and is in excellent agreement with expectations based on the QPM. 10 references. (ERA citation 04:053801)

COO-3071-241 PC **A02**/MF **A01**
Pennsylvania Univ., Philadelphia.
Recent Results from a High Pt Jet Experiment at Fermilab.
L. Cormell, M. Corcoran, and M. Dris. Apr 79, 18p CONF-790484-2
Contract EY-76-C-02-3071
American Physical Society meeting, Washington, DC, USA, 23 Apr 1979.

Some recent results from a two-arm calorimeter experiment performed at Fermilab are presented. The properties of high P/sub t/ jets produced in hydrogen from incident pions and protons were studied. These studies lead to several important results: the high P/sub t/ jet events observed are produced by parton--parton (quark or gluon) scattering, and therefore: an effective parton structure function for the pion and the internal transverse momentum of these partons could be measured. 16 references. (ERA citation 04:053804)

COO-4742-1 PC **A02**/MF **A01**
Harvard Univ., Cambridge, MA. Science Center.
Integrability Conditions for the Existence of a Lagrangian in Newtonian Mechanics and Field Theory. Annual Progress Report, March 1, 1978-May 31, 1979.
S. Sternberg, and R. M. Santilli. 1979, 18p
Contract ER-78-S-02-4742

Studies of general covariance and its application to particle motion and continuum mechanics were continued. Also developed was a new method in microlocal analysis which has applications to integral geometry, geometrical quantization and the fine structure of certain types of spectra. The classical aspect of a program was studied by a comprehensive analysis of the integrability conditions for the existence of a Lagrangian or, independently, of a Hamiltonian for the representation of given Newtonian systems with forces nonderivable from a potential, as well as the methods for the computation of these functions from the equations of motion. The study of a classical, complementary, methodological approach to the same class of systems was also initiated. It consists of the representation of systems with forces nonderivable from a potential via a generalization of Hamilton's equations posessing a Lie-admissible algebraic structure. The problem of the quantization of forces nonderivable from a potential was then studied via the use of these complementary methods. The use of the integrability conditions for the existence of a Hamiltonian representation (the inverse problem) yielded, under certain restrictions, the convention-

al Heisenberg's equations, but expressed in terms of a generalized Hamiltonian structure. The use of the Lie-admissible formulations yielded a generalization of Heisenberg's equations possessing a generalized (Lie-admissible) algebraic structure, but expressed in terms of a conventional Hamiltonian structure. These preliminary studies were then applied to the investigation of the old idea that the strong interactions are of the type considered, local and nonderivable from a potential, as an approximation of expected nonlocal settings. The experimental verification of the validity or invalidity of Pauli's exclusion principle and other basic physical laws for the nuclear and the hadronic structure was proposed. Publications are listed. (ERA citation 04:053814)

COO-881-96 PC **A03**/MF **A01**
Hawaii Univ., Honolulu. Dept. of Physics.
Hadron Collider's Guide to the Properties and Signatures of Heavy Quarks.
S. Pakvasa, M. Dechantsreiter, F. Halzen, and D. M. Scott. Jul 79, 35p UH-511-349-79
Contract EY-76-C-03-0511

Recent theoretical speculation concerning the mass of the t-quark, the charge 2/3 partner of the quark bound in UPSILON, put it, as well as possible heavier doublets, outside the reach of existing e exp + e exp - machines. If correct, hadron colliders will provide the only means of studying new flavors in the near future. A study is made of the properties of heavy quarks and their bound states, emphasizing the importance of weak effects when 2M/sub q/ greater than or equal to M/sub Z/ (mass of the intermediate boson); their various experimental signatures in hadronic collisions. Contrary to what one might suspect from past experience with charmed particles, it is anticipated that the associated production (and not the e exp + e exp - or mu exp + mu exp - invariant mass of the quark-antiquark bound state) will provide the most prominent signature via the study of anomalous e mu events. It is expected that the background to any leptonic signature is severe, suggesting the requirement of simultaneous detection of hadrons. 40 references. (ERA citation 04:053807)

CSNSM-T-77-02 PC **A07**/MF **A01**
Paris-11 Univ., 91 - Orsay (France). Centre de Spectrometrie Nucleaire et de Spectrometrie de Masse.
Study of Erbium Nuclei in the Transition Region.
P. Aguer. 1977, 138p
In French.Thesis.
U.S. Sales Only.

This work is devoted to the study of neutron deficient erbium isotopes (Z=68) with mass 155 to 159 (N=87 to 91). They were studied through the (beta exp + + E.C.) decay of Tm isotopes, obtained with on-line ISOCELE separator in Orsay. exp 155 Er was too studied via exp 147 Sm (exp 12 C,5n) reaction in Grenoble cyclotron. Experimental results obtained through classical spectroscopic devices (gamma , gamma gamma , e.c.) show out the shape transition occuring in exp 158 Er where the energy of the 0 exp + state is minimum. The level structure in exp 156 Er has a more vibrational character than the heavier isotopes. The results of radioactivity on the odd isotopes confirms the rotational character of exp 159 Er. In exp 157 Er, three low lying levels (<40 keV) are proposed as single particle levels. Data concerning exp 155 Er are considered as preliminary. The (exp 12 C, 5n) reactions on exp 147 Sm lead to a decoupled favored band assumed to be isub(13/2) which displays backbending phenomenon in opposition with the heavier odd erbium isotopes. Theoretical interpretation of these results was made for even nuclei using the DQP model of Kumar with satisfactory agreement. Hartree-Fock calculation with the Gogny strength was made with extraction of the mass parameter of the collective Hamiltonian by the Cranking method. Some applications of the 'rotor + particle' model were made to the odd erbium nuclei. (Atomindex citation 09:416386)

CU-TP-129 PC **A04**/MF **A01**
Columbia Univ., New York. Dept. of Physics.
Propagation of Fermions in A sub 0 = 0 Gauge.
S. E. Cummins. 1978, 53p
Contract EY-76-C-02-2271

In A sub 0 = 0 gauge in QED, the Ward--Takahashi identity implies the nonpropagation of the Fermi field psi. This is shown to be a valid conclusion, both by using functional integration and by perturbation theory. Since Green's functions are gauge dependent, this does not however imply the immobility of spin-1/2 fields. Two types of composite fields are exhibited for which the field psi is dressed with longitudinal, nonobservable photons. For these fields, no implications about their propagators can be drawn from the W--T identity, which for these is trivially zero. It is shown by functional integration and by perturbation theory that these fields can propagate, and interact with the photon field with the usual P(1/k/sub o/sup 2) factor of A sub 0 = 0 gauge. (ERA citation 04:047725)

CU-TP-133 PC **A02**/MF **A01**
Columbia Univ., New York. Dept. of Physics.
Unified Weak and Electromagnetic Interactions, Baryon Number Nonconservation and the Atiyah--Singer Theorem.
N. H. Christ. 1977, 11p
Contract EY-76-C-02-2271

The Weinberg--Salam model is described. Also following t'Hooft, the relation between the Pontryagin index, the Adler anomaly, and the nonconservation of baryon number is discussed. It is shown how the Atiyah--Singer theorem implements this nonconservation of baryon number in a semiclassical, Euclidean space calculation. 7 references. (ERA citation 04:052290)

DESY-78/68 PC **A03**/MF **A01**
Hamburg Univ. (Germany, F.R.). Inst. fuer Theoretische Physik (II).
Comparison of Lattice Gauge Theories with Gauge Groups Z sub 2 and SU(2).
G. Mack, and B. Petkova. Nov 78, 39p
U.S. Sales Only.

We study a model of a pure Yang Mills theory with gauge group SU(2) on a lattice in Euclidean space. We compare it with the model obtained by restricting variables to sub 2 . An inequality relating expectation values of the Wilson loop integral in the two theories is established. It shows that confinement of static quarks is true in our SU(2) model whenever it holds for the corresponding sub 2 - model. The SU(2) model is shown to have high and low temperature phases that are distinguished by a qualitatively different behavior of the t'Hooft disorder parameter. (Atomindex citation 10:450999)

DESY-79/03 PC **A02**/MF **A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
Four-Jet Production in E exp + E exp - -Annihilation.
G. Kramer, G. Schierholz, E. Pietarinen, A. Ali, and J. G. Koerner. Jan 79, 10p
U.S. Sales Only.

We investigate the four-jet production processes e exp + e exp - implies q anti qgg and e exp + e exp - implies qanti qq anti q in lowest-order QCD perturbation theory. We estimate that four-jet events should be detectable at a rate of about 5% at the highest PETRA energy. The acoplanarity distribution is calculated and compared to nonperturbative effects. (Atomindex citation 10:450993)

DOE/NDC-16/U PC **A05**/MF **A01**
Brookhaven National Lab., Upton, NY.
Compilation of Requests for Nuclear Data.
Apr 79, 82p BNL-NCS-51005
Contract EY-76-C-02-0016

The purpose of this compilation is to summarize the current needs of US Nuclear Energy programs and other applied technologies for nuclear data. At the present time needs fall primarily in the area of neutron cross sections, although no such limitation is intended. This request list is ordered by target nucleus (isotope) and then reaction type (quantity). An attempt is made to describe the quantity in standard notation. A glossary of these symbols with a short explanatory text is provided. All requests must give the energy (or range of energy) for the incident particle when appropriate. The accuracy needed in percent is also given. The error quoted is assumed to be 1 sigma at each measured point in the energy range requested unless a comment specifies otherwise. (ERA citation 04:053817)

DOE/TIC-10197 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Status of Transactinium Nuclear Data in the Evaluated Nuclear Structure Data File.
W. B. Ewbank. 1979, 39p
Contract W-7405-ENG-26

The organization and program of the Nuclear Data Project are described. An Evaluated Nuclear Structure Data File (ENSDF) was designed to contain most of the data of nuclear structure physics. ENSDF includes adopted level information for all 1950 known nuclei, and detailed data for approximately 1500 decay schemes. File organization, management, and retrieval are reviewed. An international network of data evaluation centers has been organized to provide for a four-year cycle of ENSDF revisions. Standard retrieval and display programs can prepare various tables of specific data, which can serve as a good first approximation to a complete up-to-date compilation. Appendixes list, for A > 206, nuclear levels with lifetimes > or = 1 s, strong gamma rays from radioisotopes (ordered by nuclide and energy), and strong alpha particle emissions (similarly ordered). 8 figures. (ERA citation 04:052316)

EUR-5701 PC **A05**/MF **A01**
Commission of the European Communities, Ispra (Italy). Joint Research Centre.
Analytical Evaluation of Fission Product Sensitivities.
A. Sola. 1977, 88p
U.S. Sales Only.

Evaluating the concentration of a fission product produced in a reactor requires the knowledge of a fairly large number of variables. Sensitivity studies were made to ascertain the important variables. Analytical formulae were developed sufficiently simple to allow numerical computations. Some simplified formulas are also given and they are applied to the following isotopes: exp 80 Se, exp 82 Se, exp 81 Br, exp 82 Br, exp 82 Kr, exp 83 Kr, exp 84 Kr, exp 85 Kr, exp 86 Kr. Their sensitivities to capture cross sections, fission yields, ratios of activation cross sections, half-lives (during and after irradiation), branching ratios, as well as to the neutron flux and to the time are considered. (Atomindex citation 10:422758)

EUR-5722 PC **A03**/MF **A01**
Commission of the European Communities, Ispra (Italy). Joint Research Centre.
Calculation of Nuclear Reaction Cross Section with the Statistical Model.
W. Matthes. 1977, 48p
U.S. Sales Only.

A Program (MODESTY) is described which calculates all energetically possible reaction cross-sections and particle spectra within a nuclear decay chain initiated by a nuclear reaction. The code is based on the statistical nuclear model for nuclear reactions. The partial widths for particle decay are calculated using the optical model, for gamma - decay, the Blatt-Weisskopf single-particle model. The program is designed to simplify the evaluation of cross-section data by giving maximum output information for minimum input. All necessary nuclear data are automatically searched from an external (disc) library of fundamental data. (Atomindex citation 10:422757)

FRNC-TH-753 PC **A04**/MF **A01**
Paris-11 Univ., Orsay (France).
Monte-Carlo Simulation of a Fission Experiment on the Problem of the Partition of the Excitation Energy Between Both Fragments.
M. Montoya. 1977, 64p
In French.Thesis.
U.S. Sales Only.

The possibilities for systematic errors were investigated in an experiment effected at Saclay with the purpose of measuring the fluctuation in the distribution of the excitation energy between both complementary fission fragments in the exp 252 Cf spontaneous fission. Said fluctuation is generally considered as a basic datum concerning the dynamics of the fission process (nuclear viscosity).

The whole experiment was simulated with using a FORTRAN program based on a Monte-Carlo method. Every available experimental result was used to simulate the distributions of the parameters of fission fragments, and the correlations between these parameters. As for the fluctuation in distribution of the excitation energy between both fragments, three hypotheses were drawn from different dynamic models. When simulating the de-excitation, an evaporation code (MAMI code) was used to derive laws approaching the evaporation for any fission fragments. The experimental geometry was simulated in details; DENIS code was used to simulate the neutron interaction with the liquid scintillator. The results of such a simulation are rather pessimistic as far as a large scintillation neutron detector is used: the mean distribution values for the number of evaporated neutrons are nearly representative of the mean values of the excitation energies of the fragments, but the three different hypotheses introduced about the fluctuation in distribution of the excitation energy are not unambiguously identified on the correlation between the number of neutrons emitted from each fragment. (Atomindex citation 09:410431)

IC-77-133 PC **A02**/MF **A01**
International Centre for Theoretical Physics, Trieste (Italy).
Deformation of the alpha Clusters inside Light Nuclei.
M. Y. M. Hassan, A. Rabie, and M. S. M. Noor El-Din. Nov 77, 13p
U.S. Sales Only.

The phenomenological model described by Wadia et al., considering the deformation of alpha cluster inside alpha -particle nuclei, is used to calculate the elastic form factor of electron scattering by the nuclei exp 12 C, exp 16 0 and exp 20 Ne. Analysis of the deformation parameters and comparison with experimental data is given. (Atomindex citation 09:416303)

IC-77-134 PC **A02**/MF **A01**
International Centre for Theoretical Physics, Trieste (Italy).
Jastrow Correlations in the alpha Cluster Model with Symmetrized Fermi Functions.
M. Y. M. Hassan, A. Rabie, and E. H. Ismail. Nov 77, 11p
U.S. Sales Only.

The elastic scattering form factors of electrons on exp 12 C, exp 16 0 and exp 20 Ne nuclei are calculated using wave functions which have realistic asymptotic behaviour and introducing Jastrow correlations. Analysis of the parameters and comparison with experimental data is given. (Atomindex citation 09:416304)

IC-78-17 PC **A02**/MF **A01**
International Centre for Theoretical Physics, Trieste (Italy).
Evidence of Shell Closure at N Approximately 100-114 from the Systematics in E sub 2 alpha M sub 1 Multipole Mixing Ratios of (2SUP(+') implies 2 exp +) gamma Transition in Even-Even Nuclei.
B. P. Singh, and I. V. S. Rathore. Feb 78, 8p
U.S. Sales Only.

A sub 2 /sup expet/ and A sub 4 /sup expt/, the angular correlation coefficients for the cascade 2 exp + ' implies 2 exp + implies 0 exp + for almost all the even-even nuclei have been collected and re-analyzed to calculate the amplitude mixing ratios for 2 exp + ' implies 2 exp + gamma-ray transitons. There are two methods for analyzing the data, viz. Arns and Wiedenbeck and Coleman. The phases and values which are common in both analyses are taken for the analysis. The plot in delta alpha E/sub gamma / versus mass number (A) is given and magic numbers at P approximately 28, N approximately 50, P approximately 50, N approximately 82 and also at N approximately 100-114 are indicated in this plot. (Atomindex citation 10:422765)

IC-78-21 PC **A02**/MF **A01**
International Centre for Theoretical Physics, Trieste (Italy).
Nuclear Fusion.
R. K. Gupta, and K. V. Subbaram. Mar 78, 13p
U.S. Sales Only.

Fusion of very light (with only a couple of nucleons) and of heavier nuclei is discussed, respectively, as a source of nuclear energy and towards the extension of the periodic table to include superheavy elements. In particular, laser-induced nuclear fusion is studied as a source of clean and inexpensive source of nuclear energy, giving its present status and the difficulties encountered. Theoretical and experimental studies of heavy-ion collisions are shown to add, somewhat, to our further understanding of the nuclear shell structure, with the production of superheavy elements and also many other new results and phenomena. (Atomindex citation 10:422766)

ICP-1050-4 PC **A04**/MF **A01**
Allied Chemical Corp., Idaho Falls, ID. Idaho Chemical Programs - Operations Office.
Fast Reactor Fission Yields for exp 240 Pu and exp 242 Pu.
W. J. Maeck, R. L. Eggleston, A. L. Erikson, and R. L. Tromp. Feb 79, 57p
Contract EY-76-C-07-1540

Absolute fast reactor fission yield data are presented for exp 240 Pu and exp 242 Pu irradiated in EBR-II. The measurement technique was isotope dilution mass spectrometry for over 40 mass numbers. (ERA citation 04:052318)

IFIN-SN-2-1977 PC **A02**/MF **A01**
Institutul de Fizica si Inginerie Nucleara, Bucharest (Romania).
Nuclear Life-Time Computer Programme for Complex Decay Schemes.
D. Bucurescu, G. Constantinescu, M. Duma, and M. Ivascu. Jul 77, 8p
In Romanian.
U.S. Sales Only.

A computer programme is presented, for processing data provided by non-coincident recoil-distance Doppler shift measurements, which can handle a large number of nuclear levels with a complex de-excitation scheme. (Atomindex citation 09:406592)

INDC(NDS)-90 PC **A09**/MF **A01**
International Atomic Energy Agency, Vienna (Austria). International Nuclear Data Committee.
Report on the Second Consultants' Meeting of Nuclear Reaction Data Centers Kiev, USSR, 11-16 April 1977. Including the Thirteenth Four-Center Meeting and the Third Meeting on Charged Particle Nuclear Data Compilation.
H. D. Lemmel. Oct 77, 176p CONF-7704114-
Consultants' meeting of nuclear reaction data centers, Kiev, Ukrainian SSR, 11 Apr 1977.
U.S. Sales Only.

This second "NRDC meeting" combined the 13th "four centers meeting" (consultants' meeting of the four neutron nuclear data centers) with the third "CPND meeting" (consultants' meeting on charged particle nuclear data compilation). In Part I of the meeting, the neutron data centers held a special session on neutron data matters, in particular on the jointly operated neutron data index CINDA, whereas all items of more general interest, in particular the data exchange system EXFOR, were treated in Part II of the meeting. (Atomindex citation 10:424078)

INDC(NDS)-97/LNA PC **A05**/MF **A01**
International Atomic Energy Agency, Vienna (Austria). International Nuclear Data Committee.
Report of the Nuclear Data Section to the International Nuclear Data Committee. March 1977 to August 1978.
Aug 78, 87p
U.S. Sales Only.

Progress report of the IAEA Nuclear Data Section for the 18-month period March 1977 to August 1978 is presented. Past, current and planned activities are described, status of nuclear data centre services is given. (Atomindex citation 10:424077)

INIS-mf-4326 PC **A02**/MF **A01**
Auckland Univ. (New Zealand). Dept. of Physics.
Annual Report of Nuclear Physics Group. January 1 1977 - December 31 1977.
Mar 78, 6p
U.S. Sales Only.

The experimental programme on weak interaction phenomena continued. A great deal of effort was expended in attempting to understand a discrepancy of 7 kev between determinations of the exp 42 Ca - exp 42 Sc mass difference using the (p,n) and (exp 3 He,t) reactions. Great care was taken to reduce the background in the measurement of the apparent (p,n) threshold. This however did not reduce the discrepancy. It is possible that the effective threshold does not accurately reflect the exp 42 Ca - exp 42 Sc mass difference, nevertheless the Q-value as determined by the (exp 3 He,t) reaction should be remeasured as well. The activities of the Polarized Ion Source group were concentrated on measurements of the proton polarization in the exp 3 He(d,p) exp 4 He reaction, an analysis of data previously obtained using the polarized ion source and on a modest upgrading of the polarized ion source facility. In nuclear spectroscopy the only experimental work undertaken was aimed at elucidating some problems encountered in the analysis of Doppler shift data previously obtained for the nuclei exp 41 Ar and exp 41 K. Analysis of these data and of data on exp 46 Sc, exp 44 Ti, exp 54 Mn and exp 51 Cr was undertaken through the year. (Atomindex citation 09:392634)

INIS-mf-4384 PC **A03**/MF **A01**
Potchefstroom Univ. for C.H.E. (South Africa). Faculty of Natural Sciences.
Investigation into the exp 29 Si(P,gamma) exp 30 P Reaction.
P. Oberholzer. Jan 78, 47p
In Afrikaans.Thesis(M. Sc.).
U.S. Sales Only.

In the experiment reported here, information was obtained on the energy levels of exp 30 P by means of the exp 2 Si(p,gamma) exp 30 P-reaction. The experimental work was done with two accelerators, the 3 MV Van de Graaff- accelerator of the AEB and the 2,5 MV Van de Graaff-accelerator of the P.U. for C.H.E. A 60 cm exp 3 - and a 80 cm exp 3 Ge(Li)-detector were used. The excitation curve of the exp 2 Si + p-reaction was measured in the 1,3 - 2,0 MeV energy range. In order to calculate proton energies which were more accurate, the Q-value of the reaction was redetermined. The gamma decay of 12 resonances in the energy range l,l - 1,9 MeV was studied. The branching ratios of 25 bound levels in exp 30 P were determined, as well as the excitation energy and branching ratios of two new bound levels. A different value for the excitation energy of one bound level was found. The mean lifetimes of 12 bound levels were measured by means of the doppler shift attenuation method and the results were compared to those of other groups using different methods of lifetime measurement. Spin and parity assignments based on Weisskopf estimates were made for a number of resonance states, as well as for one new bound state. The experimental results were compared with the results of two models. (Atomindex citation 09:396427)

INIS-mf-4387 PC **A05**/MF **A01**
Potchefstroom Univ. for C.H.E. (South Africa).
Energy Levels of the exp 23 Na Amd exp 27 Al Nuclei.
J. J. A. Smit. 1977, 86p
In Afrikaans.Thesis (D. Sc.).
U.S. Sales Only.

In the experiments described here information on the energy levels of the exp 23 Na and exp 27 Al nuclei were obtained by means of (p,gamma) reactions. Ge(Li) detectors were used.The exp 22 Ne(p,gamma) exp 23 Na reaction was studied in the energy range 1.11 MeV < E(p) < 1.91 MeV. An excitation curve was measured, proton energies and strengths of (p,gamma) resonances was determined. A new resonance was observed at E(p) = 1312 KeV. The gamma decay of 28 resonances were studied, and the branching ratios of 32 bound levels were determined. Mean lifetimes of 10 bound levels were measured by means of the DSA method. The excitation energies of 17 bound levels were calculated. Angular distributions led to unique spin assignments for 4 resonance levels. Weisskopf estimates yielded J = 3/2 for the E(x) = 5.97 MeV level. A comparison was made with theoretical models of the exp 23 Na nucleus. The

gamma decay of 58 resonances of the exp 26 Mg(p,gamma) exp 27 Al reaction was studied.. Branching ratios of 56 and excitation energies of 37 bound levels were determined. The mean lifetimes of 19 bound levels were measured using the DSA method. The spins and parities of 3 bound levels and 5 resonance levels were uniquely determined by means of Weisskopf estimates. The experimental results were compared with theoretical results from various models. (Atomindex citation 09:396451)

INIS-mf-4648 PC **A07**/MF **A01**
Vrije Univ., Amsterdam (Netherlands).
Electron-Capture Ratios in Radio-Active Decay.
J. van Pelt. 1978, 127p
Thesis.
U.S. Sales Only.

A review of the theory of electron capture is given and expressions for the electron-capture ratios derived. Attention is paid to the calculations of exchange and overlap correction factors. The theoretical results are then compared with experimental values on the basis of two recently published compilations. The experimental set-up used in this investigation is described and the analysis of the scintillation spectra discussed. Measurements on exp 131 Ba, exp 106 Agsup(m) and exp 196 Au are described and values derived for the exchange and overlap corrections and for the atomic electron-capture transition energy Qsub. (Atomindex citation 10:422784)

INIS-mf-4890 PC **A09**/MF **A01**
D(E, E'p)N Reaction and the Neutron Electric Form Factor.
A. E. L. Dieperink. Sep 78, 176p CONF-7808109-
Mini-conference on modern trends in elastic electron scattering, Amsterdam, Netherlands, 31 Aug 1978.
U.S. Sales Only.

An accurate determination of the electric form factor of the neutron, G/sub En/, is important both for our understanding of the structure of the nucleons, and for the description of electron scattering on nuclear many-body systems. At present only reliable model-independent information on G/sub En/ is available for four-momentum transfer (q/sub mu /) exp 2 implies 0 from the scattering of thermal neutrons off atoms. Electron scattering offers the possibility to obtain information at higher (q/sub mu /) exp 2 . However, since electrons can only be scattered off neutrons embedded in a many-body target, the extraction of G/sub En/ will in general be affected by nuclear structure uncertainties. Some methods to obtain information on G/sub En/ in e-d experiments are discussed. (Atomindex citation 10:451191)

INIS-mf-4894 PC **A06**/MF **A01**
Amsterdam Univ. (Netherlands). Zeeman Lab.
Measurement of the Reaction pi exp - p implies pi exp - pi exp + N at 17.2 GeV Using a Transversely Polarized Target.
J. G. H. de Groot. 19 Apr 78, 112p
Proefschrift (Dr.).
U.S. Sales Only.

This thesis describes an experiment to study the reaction pi exp - p implies pi exp - pi exp + n at 17.2 GeV beam momentum, using a transversely polarized butanol target. The purpose was to study the production mechanism of the reaction in greater detail using the extra information which can be obtained from a polarization measurement. The new information regarding the production mechanism then affords an independent check for earlier assumptions about the production mechanism. (Atomindex citation 10:451064)

INIS-mf-4902 PC **A06**/MF **A01**
Utrecht Rijksuniversiteit (Netherlands).
Calculations on Nucleon-Deuteron Scattering with Realistic Potentials.
C. Stolk. 22 Nov 78, 112p
Proefschrift (Dr.).
U.S. Sales Only.

The purpose of this study is to find out how the three-nucleon observables are affected by details of the two-nucleon force. The theory of the perturbational treatment of the Faddeev equations for the three-particle transition matrix for both elastic and breakup scattering is considered. Some details of the numerical treatment are discussed, results for the elastic and breakup scattering,presented, and conclusions, drawn. (Atomindex citation 10:451159)

IPNO-PhN-77-15 PC **A02**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
Structure in the Energy Spectra from Inelastic Heavy-Ion Reactions.
N. Frascaria, C. Stephan, P. Colombani, J. P. Garron, and J. C. Jacmart. Jul 77, 11p
U.S. Sales Only.

Broad structures have been observed in the incompletely relaxed part of the energy spectra of fragments emitted in the symmetrical reactions exp 40 Ca+ exp 40 Ca at 284MeV and exp 63 Cu+ exp 63 Cu at 450 MeV. Excitation energies of these structures, angular distributions and Z, N distributions leading to multiplicities for nucleon emission have been measured. They can be interpreted as being due to a predominantly direct reaction process, possibly proceeding through the excitation of highly collective high energy modes in the region of giant resonances. (Atomindex citation 09:416444)

IPNO-PhN-78-03 PC **A02**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
Possible Excited (Or Scattering) States in the Proton-Induced exp 3 He Breakup at 156 MeV.
T. Yuasa. 1978, 10p CONF-7709117-3
Conference on electro and photoexcitation, Sendai, Japan, 12 Sep 1977.
U.S. Sales Only.

The breakup of exp 3 He induced by 156 MeV protons was studied in a complete kinematic measurement of the (p,dp), (p,2p) and (p,pn) reactions using a liquid exp 3 He target under adequate kinematic conditions for the detection of p-d, p-pn and p-2p coplanar final state interactions, where pn and 2p denote a system of two nucleons in 1S sub 0 state. The analysis of events distributed in the E sub 1 -E sub 2 plane from the (p,2p) reaction reveals the existence of the (p,2pp) and (p,pnp) reactions. (Atomindex citation 10:447661)

IPNO-RC-77-08 PC **A03**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
Some Aspects of Light Particle Emission Accompanying Collisions Between Heavy Ions.
J. Galin, D. Guerreau, and R. Babinet. 1977, 32p CONF-770968-19
International conference on nuclear structure, Tokyo, Japan, 5 Sep 1977.
U.S. Sales Only.

The talk first discusses the place of deep inelastic collisions (D.I.C.) in heavy ion collisions. The main characteristics of the D.I.C. as deduced from single fragment inclusive experiments are given. Many questions about the dissipation mechanism cannot be fully answered in such simple experiments. Some recent data obtained either in fragment-fragment coincidence experiments or in light particle-fragment coincidence ones are reviewed. It is shown how the different steps in the dissipation mechanism are expected to be investigated in studying light particle emission. First it seems possible to distinguish between prompt emission (as suggested by different authors) and emission from fully equilibated fragment nuclei. Then it is shown how one can take advantage of the spatial distribution of the evaporated particles (or the out of plane - in plane angular distribution of the correlated fragments) to reach the spin of the emitting nucleus and consequently to deduce the importance of tangential friction. It is also shown how a complete study of the prompt emission could lead to a better understanding of the early stage of the dissipation process. (Atomindex citation 09:416295)

IPNO-RC-77-09 PC **A03**/MF **A01**
Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire.
What Is Limiting Complete Fusion Between Complex Nuclei.
M. Lefort. 1977, 28p CONF-770814-16
American Chemical Society meeting, Chicago, IL, USA, 29 Aug 1977.
U.S. Sales Only.

The definition of complete fusion is restricted to the following: it corresponds to interactions where both partners are joined together for a time longer than the collision time and make an intermediate which decays into the final products without any particular remembrance of the composition of the projectile and target. (Atomindex citation 09:410266)

IPNO-T-77-02 PC **A06**/MF **A01**
Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire.
Contribution to the Recognition of Odd Nuclei 'Critical' with A Next to 185.
C. Bourgeois. Apr 77, 104p
In French.Thesis.
U.S. Sales Only.

The excited states of exp 185 Au, exp 187 Au, exp 185 Pt and exp 187 Pt werestudied. The decays of exp 187 Hg, exp 185 Hg, exp 187 Au and exp 185 Au were analyzed, together with the following reactions: exp 175 Lu(exp 16 O,4n) exp 187 Au at 95 MeV, exp 175 Lu(exp 16 O,6n) exp 185 Au between 75 and 117 MeV, exp 176 Yb(exp 16 O,5n) exp 187 Pt at 90 MeV and exp 174 Yb(exp 16 O,5n) exp 185 Pt at 95 MeV. The level schemes were established: collective structures built on high-j states derived from the h/sub 9/2/ and h/sub 11/2/ subshells in the gold nuclei and the i/sub 13/2/ subshell in the Pt nuclei are pointed out. These structures are interpreted in the framework of the 'quasi-particle + asymmetric rotor' coupling model. Different deformation states are observed in the odd-mass gold nuclei with A<189 and a shape transition between exp 187 Pt and exp 185 Pt is revealed. Furthermore the evolution from spherical to deformed shapes involves triaxial shapes. (Atomindex citation 09:410338)

IPNO-T-77-08 PC **A04**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
Four- and Six-Charge Transfer Reactions Induced by exp 52 Cr, exp 56 Fe, exp 63 Cu in Rare-Earths.
These (3e Cycle),
G. Mouchaty. 1977, 71p
In French.
U.S. Sales Only.

The cross sections for transfer reactions in which 4 and 6 charges are gained by Sm and Nd targets have been measured, the projectiles being exp 52 Cr and exp 56 Fe at 343 and 377 MeV. These energies correspond to 1.5B, B being the interaction barrier. The results obtained indicate that the cross section increases when the number of charges transferred and the mass of the projectile are increased. The angular distributions and recoil ranges at each angle of exp 151 Dy produced through exp 52 Cr+ exp 148 Sm, exp 52 Cr+ exp 144 Nd, exp 56 Fe+ exp 144 Nd, exp 63 Cu+ exp 144 Nd reactions were determined for incident energies equivalent to 1.5B. After transformation into the c.m. system, the angular distributions exhibit a maximum close to 155 exp 0 and a tail at small angles. The position of the maximum is independent of the incident ion and of the number of transferred charges. The analysis of the energy distributions indicate that the observed reactions can be explained by a two-step process: a transfer of nucleons followed by an evaporation step. The number of nucleons transferred in the 1st step and the associated excitation energies are higher for the events corresponding to the tail than for those corresponding to the maximum. (Atomindex citation 09:406787)

IPNO-TH-77-28 PC **A02**/MF **A01**
Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire.
Interference Effects in Heavy-Ion Elastic Scattering.
H. Doubre, and C. Marty. May 77, 18p CONF-7705151-4
Conference on resonances in heavy ion reactions, Hvar, Yugoslavia, 30 May 1977.
U.S. Sales Only.

It is shown how to split the elastic scattering amplitude in several pieces each of which vary smoothly

in modulus, the sum of them giving eventually interferences. Applications are given to the theory of gross oscillations in excitation functions of identical heavy ion systems, to the angular distribution of exp 12 C+ exp 12 C and to the semi-classical approach to resonance phenomena. (Atomindex citation 09:416289)

IPNO-TH-77-29 PC **A02**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
Semi-Empirical Correlation Energy for Nuclei.
R. H. Behrman, and R. J. Lombard. May 77, 11p
U.S. Sales Only.

A semi-empirical interaction is used to calculate higher order corrections to the binding energies of even-even nuclei close to the line of stability. These corrections are taken to come from two phonon configurations and are treated as a perturbation with respect to the BCS nuclear ground state which is obtained from applying the energy density method to finite nuclei. The overall correspondance between theory and experiment for the 60 nuclei calculated between A=52 and A=234 is good, with excellent agreement for the non-deformed nuclei situated within the regions A=72 to 144 and A=200 to 212. The large correction energies (several MeV per nucleus on the average) indicate that these correlations are of importance for explaining nuclear binding energies and that it is necessary to include them within the energy functional itself. The fact that these correlations come almost exclusively from nucleons close to the Fermi surface is also discussed. (Atomindex citation 09:406338)

ITF-75-144R PC **A02**/MF **A01**
Akademiya Nauk URSR, Kiev. Inst. Teoreticheskoi Fiziki.
Quasi-Elastic Scattering of Fast Electrons by C exp 12 Nuclei.
V. K. Tartakovskii, I. V. Koslovskii, and E. M. Maiyarzh. 1975, 21p
In Russian.
U.S. Sales Only.

The inelastic scattering of high energy electron on C exp 12 nuclei, accompanied by the knocking out of nucleons from nuclei, is investigated. The distorted momentum distributions of nucleons in 1s- and 1p-shells of C exp 12 nucleus are calculated with the use of the harmonic oscillator wave functions for the bounded nucleon states and the wave functions in the diffraction approximation, describing the knocked-on nucleon and recoil nucleus relative motion. It is shown that using such single-particle wave functions one can have good agreement simultaneously with the experimental data, for both elastic and inelastic (with nucleon knocking-out) fast electrons scattering on C exp 12 nuclei. Besides, the energy and angular distributions for the knocked-on nucleons, recoil nuclei and scattered electrons are calculated in the plane-wave approximation with account of wave distortion. It is shown that under certain conditions it is more convenient to obtain information about nuclear structure and mechanism of the process from the consideration of the recoil nuclei distributions in the electrodisintegration reactions rather than from the consideration of the knocked-on nucleon distributions. (Atomindex citation 09:406491)

ITF-77-10-R PC **A02**/MF **A01**
Akademiya Nauk URSR, Kiev. Inst. Teoreticheskoi Fiziki.
Diffraction Description of the exp 3 Two-Particle He Splitting in Noncomplanar Geometry.
A. D. Fursa, and V. V. Peresypkin. 1977, 21p
In Russian.
U.S. Sales Only.

Theoretical analysis of the experimental data on the exp 3 He (pi , 2p) reaction in noncomplanar geometry at 590 Mev is made using the diffraction theory of multiple scattering with the isospin dependence of the nucleon-nucleon scattering amplitude taken into account. The importance of the longitudinal momentum transfer effects is indicated. The theoretical calculations are in good agreement with the experimental data. (Atomindex citation 09:406381)

JAERI-M-7545 PC **A03**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Slow Neutron Resonances in Tb-159.
M. Ohkubo, and Y. Kawarasaki. Feb 78, 33p
U.S. Sales Only.

An experiment of neutron resonances in Tb-159 was carried out using the JAERI linac time-of-flight facility. Transmission and capture measurements were made on terbium samples of two thicknesses, using exp 6 Li-glass scintillators and Moxon-Rae detector at the 47m station of the TOF facility; the neutron flux was monitored with a exp 6 Li-glass transmission type flux monitor. Transmission data were analyzed with an area analyses program up to 1.2 keV, and capture data with Monte-Carlo program CAFIT, to obtain 2g GAMMA sub(n)sup(o), GAMMA and GAMMA sub(gamma). Spin determinations were also made for large resonances. Between 754 to 1192 eV, 50 new levels were analyzed. The results are as follows; average level spacing <D> = 4.4 +- 0.4 eV below 600 eV, s-wave strength function S sub(o) = (1.55 +- 0.15)10 exp -4 for 206 levels below 1.2 keV, and average radiation width <GAMMA sub(gamma)> = 107 +- 7 meV for lower 25 levels. Average capture cross section < exp + sub(c)> were obtained from 50 eV to 30 keV. (Atomindex citation 09:410167)

JINR-E-1-10838 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Inelastic Interactions of exp 12 C Nuclei with Emulsion Nuclei at 50 GeV/C.
M. I. Adamovich, V. A. Bakaev, and B. P. Bannik. 1977, 19p CONF-770873-23
International conference on high energy physics and nuclear structure, Zurich, Switzerland, 30 Aug 1977.
U.S. Sales Only.

Inelastic interactions induced by exp 12 C relativistic nuclei were studied. Multiplicity and angular distributions of charged secondaries were analyzed. The average multiplicities, per one incident nucleon, are close to those for exp 2 H and H exp 4 e primaries at the same momentum per nucleon. The angular distributions of the target fragments (black and grey tracks) are very weakly dependent on the mass number of the incident nucleus. In 90% of exp 12 C inelastic interactions, fragments of the projectile nucleus were observed. About 2% of inelastic exp 12 C interactions correspond to the process of dissociation of the projectile nucleus into three helium nuclei; in most cases it can be interpreted as a two-stage process, involving an intermediate exp 8 Be nucleus. (Atomindex citation 09:406511)

JINR-E-1-11206 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation.
Structure of the High-Momentum Parts of the Deuteron Spectra from D-D Collisions at 4.3, 6.3 and 8.9 GeV/C.
L. S. Azhgirey, M. A. Ignatenko, and V. V. Ivanov. 1978, 12p
U.S. Sales Only.

The experimental data on d-d collisions at 4.3, 6.3 and 8.9 GeV/c exhibiting the two-peak structure in the high-momentum parts of the secondary deuteron spectra at momentum transfers (t) approximately 0.4-0.8 (GeV/c) are presented. An analysis of the results in terms of the multiple nucleon-nucleon scattering model is performed. Some conclusions about the mechanism of the elastic and quasi-elastic d-d scattering at the above-mentioned momentum transfers are made. This scattering occurs, in the main, by means of such double scattering when in simultaneous collisions both the nucleons of the incident deuteron scatter each on one of the two target nucleons. Such a mechanism of the elastic d-d scattering allows rather great momentum transfers to both the deuteron nucleons at their small relative momentum. (Atomindex citation 10:451173)

JINR-E-2-11296 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Decay of Giant Resonances States in Radiative Pion Capture by 1P Shell Nuclei.
G. E. Dogotar, R. A. Eramzhyan, R. A. Sakaev, and G. R. Kissener. 1978, 11p
U.S. Sales Only.

The decay of the giant resonance states excited in tthe radiative pion capture on the exp 9 Be, exp 11 B, exp 13 C and exp 14 N nuclei is considered in the shell model with intermediate coupling. It is shown that the excited states in the daughter nuclei (A-1, Z-1) are mainly populated by intermediate states with spin by two units larger than the spin of the target nuclei. Selected coincidence experiments are proposed. (Atomindex citation 09:406363)

JINR-E-2-11307 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Mechanism of Proton Emission in Kinematic Region Forbidden for Free Particle Scattering.
K. K. Gudima, S. G. Mashnik, and V. D. Toneev. 1978, 11p
U.S. Sales Only.

The backward yield of high energy protons in proton-nucleus reactions at T = 640 MeV is investigated in the framework of the cascade model taking account of the preequilibrium particle emission. A weak sensitivity of the inclusive distributions to the specific reaction mechanism and a need of correlation and polarization measurements are noted. (Atomindex citation 09:406395)

JINR-E-2-11573 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Construction of Renormalized Coefficient Functions of the Feynman Diagrams by Means of a Computer.
O. V. Tarasov. 1978, 14p
U.S. Sales Only.

An algorithm and short description of computer program, written in SCHOONSCHIP, are given. The program is assigned for construction of integrands of renormalized coefficient functions of the Feynman diagrams in scalar theories in the case of arbitrary subtraction point. For the given Feynman graph computer completely realizes the R-operation of Bogolubov-Parasjuk and gives the result as an integral over Feynman parameters. With the help of the program the time construction of the whole renormalized coefficient function is equal approximately 30 s on the CDC-6500 computer. (Atomindex citation 10:450208)

JINR-E-2-11633 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Nonautomodel Corrections in the Large Angle Scattering of Particles with Spin.
S. V. Goloskokov, A. V. Koudinov, and S. P. Kuleshov. 1978, 25p
U.S. Sales Only.

Nonautomodel corrections of two orders in 1/ sqrt s to the amplitudes of elastic meson-nucleon and nucleon-nucleon scattering are discussed in the framework of the Logunov-Tavkhelidze quasipotential approach. The consideration of corrections improves the description of the experimental data that proves self-consistency of the model discussed. The corrections to the amplitudes of pi exp +- p scattering are comparable with the leading asymptotic term for energies up to p/sub L/ approximately = 40 (GeV/c) that results in considerable deviations from the predictions of quark counting rules. For the case of proton-proton scattering the magnitude of corrections is rather smaller, and the deviations from quark counting rules are negligible. (Atomindex citation 10:451127)

JINR-E-2-11635 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Theory of High-Energy Nucleus-Nucleus Scterng in the Eikonal Approximation.
A. S. Pak, A. V. Tarasov, Ch. Tseren, and V. V. Uzinskii. 1978, 12p
U.S. Sales Only.

The purpose of the paper is to present a closed optical limit expression for the multiple scattering expansion of the amplitude of nucleus-nucleus scattering F/sub AB/ (A and B are colliding nuclei) in terms of the thickness function T/sub A/ and T/sub B/ of the colliding nuclei. The main steps in its derivation are pointed out. It is shown that the

knowledge of the functional dependence F/sub AB//sup opt/=F/sub AB//sup opt/(T/sub A/, T/sub B/) allows one to calculate some important characteristics of nucleus-nucleus interactions by simple functional differentiation. The Glauber approximation for nucleon-nucleon scattering amplitudes, the independent particle model for nuclear densities and zeroth radius approximation for nucleon-nucleon interaction are used. The predictions for elastic and for inelastic scattering with excitation in exp 12 C(alpha , alpha) exp 12 C* and exp 40 Ca(alpha , alpha) exp 40 Ca* are compared with experimental data and results of other theoretical approaches. (Atomindex citation 10:451141)

JINR-E-4-10517 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Spreading of the Giant Quadrupole Resonance in exp 16 O.
M. Gmitro, E. Tinkova, A. Rimini, and T. Weber. 1977, 10p
U.S. Sales Only.

Isoscalar and isovector E2 strength distributions in exp 16 O were obtained from the mixing of lp-lh and 2p-2h configurations. The two isospin modes are clearly separated in energy. The calculated Jsup(pi)T=2sup(+)0 levels in the 17-25 MeV energy region exhaust 33-34 % of the EWSR (energy weighted sum rule) if the ground state correlations are taken into account. This result is in nice agreement with the most recent experiments (37-40% of the EWSR). The strength attributed to the individual levels strongly depends on the choice of f-p shell parameters. (Atomindex citation 09:406388)

JINR-E-4-11121 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Calculation of Giant E lambda-Resonances of High Multipolarity in Deformed Nuclei.
M. A. Kiselev, L. A. Malov, V. O. Nesterenko, and V. G. Soloviev. 1978, 16p
U.S. Sales Only.

The strength functions b(E lambda ; 0 exp + implies lambda sup(pi) for the excitation of multipole resonances with lambda = 4,5,6 and 7 in doubly even deformed nuclei are investigated. The conclusions are made about possible energy regions of finding the giant electric resonances of high multipolarity. (Atomindex citation 09:406422)

JINR-E-4-9733 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR).
Effect of Residual Interaction the Particle-Particle Channel on Low-Lying Excitations in Spherical Nuclei.
D. Dambasuren, V. G. Soloviev, Ch. Stoyanov, and A. I. Vdovin. 1976, 15p
U.S. Sales Only.

The effect of multipole-multipole interaction in the particle-particle channel by the description of the properties of 2 sub 1+ and 3 sub 1- levels in tellurium and cadmium isotopes is investigated. The satisfactory agreement between theory and experiment is achieved with constant values of k sub 2 , kappa sub 2 and esub(eff) for different isotopes of the given element. (Atomindex citation 09:406354)

JINR-E-7-10464 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Reactions.
Nucleon Transfer Reactions in the Bombardment of exp 197 Au with 220 MeV exp 40 Ar Ions.
A. G. Artukh, E. Gierlik, R. Gerstenberger, G. F. Gridnev, and A. N. Mezentsev. 1977, 19p
U.S. Sales Only.

A exp 197 Au target was bombarded with exp 40 Ar ions with an energy of 220 MeV which exceeds the interaction barrier by a factor of 1.15. By using the delta E, E technique the formation of reaction products with atomic numbers 11 (<=) Z (<=) 35 has been recorded. The angular distributions of the products of multinucleon transfer reactions involved in deep inelastic nuclear collisions are found to be forward peaked. In reactions involving the transfer of few nucleons the shape of the angular distributions depends on the extent of the dissipation of the initial kinetic energy. (Atomindex citation 09:406530)

JINR-E-7-10587 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Reactions.
Mass Distribution of Fission Fragments in the exp 208 Pb + exp 48 Ca Reaction.
R. Kalpakchieva, Yu. Ts. Oganessian, Yu. E. Penionzhkevich, H. Sodan, and B. A. Gvozdev. 1977, 11p
U.S. Sales Only.

Experimental results of measuring mass distribution of compound nucleus fission fragments, produced in the exp 208 Pb+ exp 48 Ca reaction at 25 MeV excitation energy are presented. The radiochemical technique was used in the experiments. Mass and isotopic distributions of exp 256 102 compound nucleus fission fragments have been obtained. Mass distributions had sharply expressed asymmetry, in this case asymmetrical fission with heavy fragment generation in the mass region Asub(N)=142-145 1.5-1.7 times more preferable than asymmetric distribution Asub(N)=Asub(L) approximately 128. The asymmetric mass distribution obtained testifies to the shell effects conservation in the exp 256 102 nucleus at 25 MeV excitation energy. (Atomindex citation 09:406732)

JINR-E-7-10722 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Reactions.
Experiments to Produce Odd-Mass Neutron-Deficient Isotopes of Superheavy Elements by exp 48 Ca Ion-Induced Reactions.
G. M. Ter-Akopian, H. Bruchertseifer, and G. V. Buklanov. 1977, 17p
U.S. Sales Only.

Experiment to produce neutron-deficient isotopes of superheavy elements in the reactions exp 233 U (exp 48 Ca, 2n) exp 279 112, sup(231)Pa(exp 48 Ca, 3n)sup(276)111 and sup(232)Th(exp 48 Ca,2-3n)sup(277-276)110 have been carried out using a heavy ion beam of the U-300 accelerator. In these reactions, the upper limits of production cross sections and spontaneous-fission half-lives been determined to be 7x10 exp -35 cm exp 2 , 5x10 exp -35 cm exp 2 and 2x10 exp -35 cm exp 2 , and 0.05 s, 0.003 s and 0.003 s, respectively. (Atomindex citation 09:406853)

JINR-E-7-10750 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Reactions.
Experiments to Produce Isotopes of Superheavy Elements with Atomic Numbers 114-116 in exp 48 Ca Ion Reactions.
Yu. Ts. Oganessian, H. Bruchertseifer, and G. V. Buklanov. 1977, 25p
U.S. Sales Only.

Experiments have been conducted to synthesize isotopes of elements 114-116 in fusion reactions between exp 48 Ca ions and sup(246,248)Cm, sup(243)Am and sup(242)Pu isotopes. Irradiations by exp 48 Ca ions at 267 MeV have been carried out using an internal beam of the cyclotron U-300 with the average current of exp 48 Ca ions 10 exp 12 fr/s. As in conformity with the theoretical predictions, the superheavy elements with Z=112-116 must possess higher volatility and the elements with Z=108-111 must be analogs of heavy metals with Z=76-79, upon irradiation from the target by chemical methods fractions of volatile elements, heavy noble gases, sulphides of heavy metals as well as Cf-Fm fraction have been isolated. The obtained samples (60%) have been put in contact with phosphate glasses for detecting spontaneous fission of superheavy elements with the period Tsub(sf) from 2 h. to a year. At the same time a part of the samples (20%) has been placed in an alpha-spectrometer. No unknown spontaneously fissioning and alpha-active radiations have been observed. Upper limits of the production cross sections for superheavy elements in the studied reactions: for spontaneously-fissioning activity sigma<5x10 exp 35 cm exp 2 , for alpha-active isotopes with the period 2h(<=)T<10 days sigma < 5x10 exp -34 cm exp 2 . (Atomindex citation 09:406799)

JINR-E-7-10834 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Reactions.
Polarization Effects in the Reactions Induced by Heavy Ions.
V. A. Karnaukhov. 1977, 18p
U.S. Sales Only.

The decay of a polarized compound nucleus with a high angular momentum is considered. The calculations have been performed for the Coulomb potential on the surface of the dynamically deformed rotating nucleus with sharp edge. The known results on the shape of the rotating nucleus obtained in the framework of the liquid-drop model have been used. The polarization degree is estimated for neutrons evaporated by the polarized nucleus with a high angular momentum. The multinucleon transfer reactions (partial fusion) with light fragment detection are considered as a tool for the production of a high spin polarized nuclei. (Atomindex citation 09:406417)

JINR-E-7-11364 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Reactions.
Applicability of the QsUb(Gg)-Systematics to the Description of Cross Sections for Multinucleon Transfer Reactions Induces by exp 40 Ar, exp 86 Kr, and exp 136 Xe Ions.
E. A. Cherepanov, 1978, 19p
U.S. Sales Only.

Relative cross sections have been calculated for the production of gold isotopes with mass numbers of the 190-199 MeV range in the exp 181 Ta+ exp 40 Ar, exp 181 Ta+ exp 86 Kr and exp 181 Ta+ exp 136 Xe systems at laboratory bombarding energies of 290, 550 and 840 MeV, respectively. It was assumed that gold isotopes were produced as a result of multinucleon transfers followed by neutron evaporation. The yield of primary gold isotopes was found using the Qsub(gg)-systematics, whereas the neutron evaporation process was calculated within the framework of the Jackson model. The parameters used in the calculation are the average entrance angular momentum anti l, temperature UPSILON and the nuclear parameter r sub 0 of exit reaction channels. For realistic values of the parameters indicated a good agreement with the experimental data obtained previously has been achieved. This provides evidence for the applicability of the Qsub(gg)-systematics to the description of multinucleon transfer reactions induced by very heavy ions. (Atomindex citation 09:406352)

JINR-R-15-10665 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Competition Between Neutron Emission and Fission in the pi exp - +Th Reaction.
V. S. Butsev, L. Vasharosh, Zh. Ganzorig, Yu. V. Norseev, and D. Chultehm. 1977, 9p
In Russian.
U.S. Sales Only.

The paper is devoted to the experimental verification of the narrowing effect of neutron multiplicity distribution in the case of exp 232 Th(pi exp - ,xn) reaction. The metallic thorium target has been irradiated at the slow neutron beam. The alpha -particle spectrum has been measured by Si(Au) surface barrier detector. For exp 211 At, exp 210 At, exp 209 At, exp 208 At, exp 207 At isotopes formed in the reaction experimentally, the upper limit of neutron yield equal to 10 exp -4 has been established. On the basis of comparison with calculations the conclusion has been made that the neutron multiplicity distributions in negative pion absorption by strongly fissioning nuclei are much narrower than those for weakly fissioning nuclei. (Atomindex citation 09:410347)

JINR-R-15-9455 PC **A03**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR).
Study on the Nuclear Structure of exp 90 Zr by the Average Resonance Spectroscopy Method.
E. Piotrovski, G. Sheflinska, and Z. Sheflinski. 1976, 28p
In Russian.
U.S. Sales Only.

The exp 89 Y(p, gamma) exp 90 Zr reaction was studied for the proton energy range of 2.2-3.4 MeV

using the Ge(Li) deteMeV to be obtained.tor. The measurements a spectrum of gamma rays directly populating the low-excited levels of the final nucleus averaged in the energy range of 1.2 MeV. The results point to the existence of a correlation between the intensity of high energy gamma transition and the spin and parity of the final states populated in these transitions. From these averaged intensities the values of spin and parity of a number of levels in exp 90 Zr were determined. Techniques for the processing of obtained data are described in a detail. (Atomindex citation 09:406809)

JINR-R-2-11756 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Processes with Large Momentum Transfer in High Energy Potential Scattering.
V. I. Inozemtsev. 1978, 20p
In Russian.
U.S. Sales Only.

The processes of high-energy three-particle scattering with a high momentum transfer are considered within the framework of the Watson theory. It is shown that the approximation of subsequent rescatterings is insufficient for describing of high-energy scattering on bound states with large momentum transfer. As an example the three-dimensional potential model is considered for which the two-particle off-shell amplitudes may be represented in an analytical form. For this model it is shown that the collective phenomena may be important in the domain kinematically forbidden for an elementary collision. The problem of longitudinal momentum transfer in the eikonal region is discussed. (Atomindex citation 10:451128)

JINR-R-2-9753 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR).
Fast Proton Yields and Their Asymmetry in Nuclear mu exp - -Capture.
G. E. Dogotar, R. A. Sakaev, and Yu. A. Salganik. 1976, 10p
In Russian.
U.S. Sales Only.

The fast proton yield in the mu exp - -capture has been considered by the example of exp 16 O nucleus. The process has been studied within the impulse approximation on a weak interaction using the traditional effective muon-nucleon Hamiltonian. 5 figures. (Atomindex citation 10:422706)

JINR-R-3-11381 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics.
Study on the exp 123 Te(N, gamma alpha) exp 120 SN Reaction on Resonance Neutrons.
1978, 12p
In Russian.
U.S. Sales Only.

The results of the study of the exp 120 Te(n, gamma alpha) exp 120 Sn reaction on resonance neutrons are given. The study was undertaken in order to derive information on primary soft gamma -transitions. The GITAsub(gamma alpha) width was measured in the 2.33 eV resonance and the upper estimate for GITAsub(gamma alpha) width in the 24.1 eV resonance was obtained. The value of radiative strength function for soft gamma - transitions Ssub(gamma)sup(cc), calculated on its basis, turned out to be a little less than the Ssub(gamma)sup(cc) mean value for other nuclei. The result obtained is discussed in connection with the hypothesis concerning possible correlation of Ssub(gamma)sup(cc) with neutron strength function value S sub 0 . (Atomindex citation 09:406864)

JINR-R-3-11644 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics.
Investigation of the exp 123 Te(N, alpha) exp 120 SN Reaction.
1978, 14p
In Russian.
U.S. Sales Only.

Alpha-spectra of the exp 123 Te(n, alpha) exp 120 Sn reaction in neutron resonances are investigated. This allows one to make the alpha-widths measurements more precise and to determine spins of resonances. The measurements were performed on the IBR-30 pulsed reactor by the time-of-flight technique. A cylindrical ionization chamber with a grating was used as an alpha-spectrometer. For the resonances E sub 0 =24.1, 96.8, 235.3, 274.8, 436.6 and 562.2 eV the spin was determined to be 0 exp + , and alpha-widths of the transition to the ground state of the daugther nucleus were measured. The distributions of the alpha-widths obtained are well described by the CHI exp 2 distribution with nu =1 and (GITA/sub alpha /)=7x10 exp -7 eV. (Atomindex citation 10:447653)

JINR-R-4-11301 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics.
Calculation of Shell Corrections for Semiempirical Formulas for Nuclear Masses.
G. G. Bunatyan. 1978, 13p
In Russian.
U.S. Sales Only.

Shell corrections deltaE for semiempirical formulas for nuclear masses are calculated taking consequently into account a strong nucleon-nucleon interaction. The precision of the developed method is under discussion. The dependence of deltaE on the parameters introduced into calculation is thoroughly investigated. The inaccuracy in calculating deltaE may be approximately 1-2 MeV. Therefore the method is applicable for investigations of nuclear properties which do not require higher precision. (Atomindex citation 09:406346)

JINR-R-4-11304 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics.
Dependence of the Mass Shell Corrections on Z,N.
G. G. Bunatyan. 1978, 14p
In Russian.
U.S. Sales Only.

Shell corrections deltaE for the semiempirical formulas for nuclear masses are calculated taking into account the pair correlations of the superconducting type. The dependence of deltaE(N,Z) on Z,N is studied in the vicinity of exp 208 Pb and for 110 (<=) Z (<=) 120, 174 (<=) N (<=) 188. It is shown that in these two cases they are quite different. It follows from the comparison of deltaE(Z, N) calculated in the above cases that for 110 (<=) Z (<=) 12O, 174 (<=) N (<=) 188 there is no nucleus with a magic number of nucleons. Some estimates of alpha -decay periods for superheavy nuclei are given. (Atomindex citation 09:406345)

JINR-R-4-7907 PC **A03**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Rotational Invariance and Effective Charges for E2 Transitions with delta K = 1 in Odd-Mass Nuclei.
N. I. Baznat, and N. I. Pyatov. 1974, 26p
In Russian.
U.S. Sales Only.

It is shown that the rotational invariance of an arbitrary axially-symmetric nuclear potential can be restored with the aid of effective factorized two-body forces whose form and strength parameters are associated with the nonspherical part of the potential. The Hamiltonian obtained according to this method is applied to the descripton of K/sup pi / =1 exp + excitations in even-even deformed nuclei. In RPA those excitations are separated into rotational and vibrational branches. In odd-mass nuclei the polarization effects arising from the coupling of quasi-particle to vibrational 1 exp + states of the core are considered. In particular, this coupling leads to a renormalization of one-particle matrix elements of E2 transitions with delta =1. The renormalization may be reduced to dynamic (configuration dependent) effective charges. The calculated charges are shown. The interband E2 transitions in exp 235 U have been considered within the framework of the intermediate coupling model. The B(E2, delta K=1) values are, to the leading order, due to the Coriolis coupling of states, but the contribution from single-particle transitions reduces these values by as much as 20 to 30%. (Atomindex citation 10:422705)

JINR-R-4-8965 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR).
Study on the Dependence of Collective Parameters of Even-Even Deformed Nuclei on an Angular Momentum.
D. Karadzhov, I. N. Mikhailov, E. Nadzhakov, and J. Piperova. 1975, 20p
In Russian.
U.S. Sales Only.

Numerical estimates of the nonadiabatic factors, determining the spin-dependence of the basic collective parameters of even-even deformed nuclei are obtained on the basis of a model proposed earlier by the authors. The results obtained by the solution of the equations at non-zero values of the spin show the important role of pairing in the deformability of rotating nuclei. (Atomindex citation 09:406416)

JINR-R-4-8972 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR).
Strength Functions of the beta exp + Decay of Sup(117-123)Ba Isotopes.
A. A. Kuliev, D. I. Salamov, and S. P. Ivanova. 1975, 21p
In Russian.
U.S. Sales Only.

The strength functions of the allowed Gamow-Teller transitions of sup(117-123)Ba isotopes have been investigated in the framework of the random phase approximation taking into account the residual pair and charge-exchange spin-spin forces. The single-particle level schemes in the spherical and deformed Saxon-Woods potential have been used in the calculations. The maximum of the strength function is predicted by the theory for sup(117,123)Ba isotopes at the energy 4-5 MeV. In the formation of the maximum the main contribution is from the allowed a.u. transitions p(404) implies n(404) and p(413) implies (413). The maximum of the sup(117-123)Ba isotope strength function is shifted to small excitation energies with the increase of the mass number A. (Atomindex citation 09:406435)

JINR-R-4-9054 PC **A03**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR).
Single-Particle Quasi-Stationary States of Spherical and Deformed Nuclei.
E. Bang, F. A. Gareev, I. V. Puzynin, and R. A. Yamaleev. 1975, 30p
In Russian.
U.S. Sales Only.

A method is presented for investigation of single particle quasi-stationary states of spherical and deformed nuclei in a subbarrier energy region. The wave functions and the energy levels of quasi-stationary states are found as eigensolutions of the Schroedinger equation using a continuous analog of the Newton method. (Atomindex citation 09:406333)

JINR-R-4-9081 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR).
Calculation of Single-Particle States of Deformed Nuclei in the Saxon-Woods Potential. Fortran Program.
S. P. Ivanova, and N. Yu. Shirikova. 1975, 24p
In Russian.
U.S. Sales Only.

A brief description is presented for the method of calculating single-particle states of deformed nuclei in the Saxon-Woods potential. The base calculation formulae, short program characteristics (written in the FORTRAN language) as well as the description of their input data have been presented. (Atomindex citation 09:406412)

JINR-R-4-9278 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR).
Calculations of alpha Widths in the Shell Model Approach with Woods-Saxon Potential. Fortran Program.
S. Kholan. 1975, 14p
In Russian.
U.S. Sales Only.

The method of calculating alpha decay widths on the basis of the integral formula in frame work of the shell model with the Woods-Saxon selfconsistent potential is presented along with a formula for calculations; the corresponding FORTRAN program is given. (Atomindex citation 09:406420)

JINR-R-4-9279 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR).
Effect of Higher Components in the alpha -Particle Internal-Wave-Function on alpha -Transition Probabilities in Spherical Nuclei.
S. Kholan, and V. I. Furman. 1975, 16p
In Russian.
U.S. Sales Only.

Formulas are derived to consider higher components of the internal alpha -particle wave function in alpha -widths calculations. Some numerical calculations of alpha -widths are performed for harmonic oscillator shell model basis using a phenomenological form of the alpha -particle internal wave function which fits its charge form-factor. The results of these calculations indicate that the account for higher components may appreciably influence the relative and absolute values of alpha -widths. (Atomindex citation 09:406421)

JINR-R-4-9339 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR).
Method for the Calculation of Matrix Elements of the Microscopic Nuclear Hamiltonian in the Space of Collective Fermion States.
R. V. Dzholos, and D. Yanssen. 1975, 14p
In Russian.
U.S. Sales Only.

A new method is developed for calculating the matrix elements of the microscopic nuclear hamiltonian between collective states. This method takes into account the Pauli-principle approximately and does not need any introduction of collective variables explicitly. (Atomindex citation 09:406367)

JINR-R-4-9564 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR).
Some Models in the Theory of Heavy Ion Fusion. Quasi-Stationary States and the Fusion Channel Separation.
G. N. Afanas'ev, M. B. Dobromyslov, and 1976, 15p
In Russian.
U.S. Sales Only.

Possible modifications of the known Thomas model have been considered. Three physical determinations of the channel of influence are suggested: using quasi-stationary states; by introducing the final depth of the imaginary potential; and in the framework of the model with the energy dissipation. It is shown that the best agreement with experimental data is achieved in the last case. (Atomindex citation 09:406318)

JINR-R-4-9672 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR).
Study on Electromagnetic Transitions in Odd-A Deformed Nuclei at Intermediate and High Excitation Energies.
S. V. Akulinichev, and L. A. Malov. 1976, 12p
In Russian.
U.S. Sales Only.

A method has been suggested that allows one to study the electromagnetic transitions in odd-A deformed nuclei without solving the eigenvalue problem. The method can be applied both for the low-lying states and for the intermediate and high excitation energies of nuclei. The calculation results are presented for exp 239 U. (Atomindex citation 09:406320)

JINR-R-4-9697 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR).
Description of the Giant Quadrupole Resonance in Deformed Nuclei.
G. Kyrchev, L. A. Malov, V. O. Nesterenko, and V. G. Solov'ev. 1976, 12p
In Russian.
U.S. Sales Only.

Giant quadrupole resonances with T = 0,1 are studied in the framework of the semimicroscopic method. The consideration of the angular momentum projection K = 0,1,2 favours the broadening of resonances. The position of the isoscalar resonance for sup(154)Sm and sup(238)U is in agreement with experimental data. The influence of the fragmentation of one-phonon states on the width of the giant resonance is considered. (Atomindex citation 09:416325)

JINR-R-4-9873 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR).
Semimicroscopic Description of the Giant Dipole Resonances in Deformed Nuclei.
S. V. Akulinichev, and L. A. Malov. 1976, 15p
In Russian.
U.S. Sales Only.

Within the framework of the semi-microscopic approach a method is proposed for the calculation of the giant dipole resonance in deformed even-even nuclei. As the residual interaction, the long-range dipole-dipole forces and pairing correlations are used. Calculations were carried out in the random phase approximation, without taking anharmonicity into account. The results of calculations for a number of nuclei from exp 152 Sm till exp 238 U are consistent with the experimental data. (Atomindex citation 09:406319)

JINR-R-7-8676 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR).
Systematics of the Intensities and Feeding Times of Rotational Bands in Compound Nuclei Formed in Heavy-Ion Reactions.
B. Bochev, S. A. Karmyan, T. Kutsarova, and Yu. Ts. Oganesyan. 1975, 25p
In Russian.
U.S. Sales Only.

Experimental data on intensities and feeding times of the rotational bands of even-even nuclei produced in the (Hi, xn) reactions have been classified. The correlation between the average spin of the populated level and the average angular momentum of the compound nucleus has been quantitatively considered. Semiquantitative calculations have been given for angular momentum and excitation energy distribution of the nuclei after the neutron evaporation for a fixed final product of the reaction. A simple formula has been given for calculation of Isub(crit.) - a critical angular momentum for production of a compound nucleus in interactions of heavy ions with nuclei. (Atomindex citation 09:406342)

KIYI-75-20 PC **A02**/MF **A01**
Akademiya Nauk URSR, Kiev. Inst. Yadernykh Issledovanii.
Nondiagonal Interaction Spin Dependence in the exp 3 He(D,p) exp 4 He Reaction.
A. M. Yasnogorodskii. 1975, 9p
In Russian.
U.S. Sales Only.

Without any model assumptions it is shown for exp 3 He(d,p) exp 4 He reaction that there is no channel spin selection rule delta S=-1 and that off-diagonal tensor interaction, which couples deuteron and proton channels, has to be present to explain the experimental data. (Atomindex citation 10:422711)

LBL-9015 PC **A04**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Bootstrapping Quarks and Gluons.
G. F. Chew. Apr 79, 51p CONF-790365-4
Contract W-7405-ENG-48
16. rencontre de moriond, Les Arcs, Savoie, France, 17 Mar 1979.

Dual topological unitarization (DTU) - the approach to S-matrix causality and unitarity through combinatorial topology - is reviewed. Amplitudes associated with triangulated spheres are shown to constitute the core of particle physics. Each sphere is covered by triangulated disc faces corresponding to hadrons. The leading current candidate for the hadron-face triangulation pattern employs 3-triangle basic subdiscs whose orientations correspond to baryon number and topological color. Additional peripheral triangles lie along the hadron-face perimeter. Certain combinations of peripheral triangles with a basic-disc triangle can be identified as quarks, the flavor of a quark corresponding to the orientation of its edges that lie on the hadron-face perimeter. Both baryon number and flavor are additively conserved. Quark helicity, which can be associated with triangle-interior orientation, is not uniformly conserved and interacts with particle momentum, whereas flavor does not. Three different colors attach to the 3 quarks associated with a single basic subdisc, but there is no additive physical conservation law associated with color. There is interplay between color and quark helicity. In hadron faces with more than one basic subdisc, there may occur pairs of adjacent flavorless but colored triangles with net helicity +-1 that are identifiable as gluons. Broken symmetry is an automatic feature of the bootstrap. T, C and P symmetries, as well as up-down flavor symmetry, persist on all orientable surfaces. (ERA citation 04:049342)

LBL-9022 PC **A07**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Vector Current Scattering in Two Dimensional Quantum Chromodynamics.
N. L. Fleishon. Apr 79, 135p
Contract W-7405-ENG-48
Thesis.

The interaction of vector currents with hadrons is considered in a two dimensional SU(N) color gauge theory coupled to fermions in leading order in an N exp -1 expansion. After giving a detailed review of the model, various transition matrix elements of one and two vector currents between hadronic states were considered. A pattern is established whereby the low mass currents interact via meson dominance and the highly virtual currents interact via bare quark-current couplings. This pattern is especially evident in the hadronic contribution to inelastic Compton scattering, M/sub mu nu / = integral dx e/sup iq.x/ < n vertical bar T*(J/ sub mu /(x)J/sub nu /(0)) vertical bar m >, which is investigated in various kinematic limits. It is shown that in the dual Regge region of soft processes the currents interact as purely hadronic systems. Modification of dimensional counting rules is indicated by a study of a large angle scattering analog. In several hard inclusive nonlight cone processes, parton model ideas are confirmed. The impulse approximation is valid in a Bjorken--Paschos-like limit with very virtual currents. A Drell-Yan type annihilation mechanism is found in photoproduction of massive lepton pairs, leading to identification of a parton wave function for the current. 56 references. (ERA citation 04:050739)

LBL-9348 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Study of Rare Muon Induced Processes.
A. R. Clark, K. J. Johnson, and L. T. Kerth. Jun 79, 7p CONF-790642-3
Contract W-7405-ENG-48
International conference on high energy physics, Geneva, Switzerland, 27 Jun 1979.

Interactions of the type mu N implies (n mu)X (n = 1, 2, 3, 4, 5) are being studied with high sensitivity in the Multimuon Spectrometer in the Fermilab muon beam. Results are reported on inelastic structure functions, production of psi(3100) and exotic multimuon final states. (ERA citation 04:049340)

LBL-9468 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Comparison of Fragmentation Calculations within Microscopic and Macroscopic Frameworks.
D. J. Morrissey. Jul 79, 14p CONF-790743-2
Contract W-7405-ENG-48
Symposium on heavy ion physics from 10-200 MeV/A, Upton, NY, USA, 16 Jul 1979.

The calculation of the isotopic production cross sections from high-energy heavy-ion reactions has proceeded along two divergent paths. From the regime of relativistic heavy-ion reactions comes the abrasion--ablation model, which is dependent on the quick nature of these collisions and the separation of the reactant nuclei into participants and spectators. From the intermediate energy regime comes the intranuclear cascade model, where the reaction is treated as a sum of nucleon--nucleon scattering events inside a nuclear potential well. Both frameworks are able to treat projectile as well as target fragmentation. In this report the results of both model calculations are compared with recent experimental data for the fragmenta--ion of 213-MeV/A exp 40 Ar projectiles by exp 12 C nuclei and for the fragmentation of exp 209 Bi target nuclei by a 400-MeV/A exp 20 Ne beam. These comparisons show the importance of the statistical decay process in determining the distribution of final products as well as the deficiencies of the two models. 3 figures. (ERA citation 04:052320)

LUIP-7803 PC **A03**/MF **A01**
Lund Univ. (Sweden). Fysiska Institutionen.

Heavy Ion Reactions at 75-100 MeV/Nucleon.
R. Kullberg, and A. Oskarsson. Apr 78, 26p
LUNFD6-NFFK-7003-1-20(1978)
U.S. Sales Only.

Energy and momentum component distributions of singly and doubly charged particles in exp 16 O-emulsion nucleus interactions at 75-100 MeV/n are presented. The parallel momentum distributions show larger shifts than at 2 GeV/n, indicating emission from system with mean velocities approximately 0.06c relative to the parent nuclei. Particles with intermediate rapidities have, on the average, larger transverse momenta than particles with large rapidities. The charged particle multiplicity in peripheral collisions is the same at 0.1, 0.2 and 2 GeV/n, while the increase in multiplicity for central collisions is pronounced. (Atomindex citation 09:406758)

LUIP-7805 PC **A02**/MF **A01**
Lund Univ. (Sweden). Fysiska Institutionen.
Central 56-Fe-Nucleus Reactions at 1.7 GeV/Nucleon.
K. B. Bhalla, S. Hertzman, A. Oskarsson, I. Otterlund, and B. Jakobsson. May 78, 12p
LUNFD6-NFFK-7005-1-6(1978)
U.S. Sales Only.

Preliminary results on multiplicity and angular distributions in exp 56 Fe-nucleus reactions at 1.7 GeV/nucleon are given. In particular we study central collisions in C, N and O. These reactions show a very characteristic behaviour with all charged particles in the forward hemisphere in the lab system, but with very few particles within the expected projectile fragmentation cone. Furthermore in these reactions a large number of fast protons (p > 1 GeV/c) originate from the target nucleus. (Atomindex citation 09:406558)

LYCEN-7732 PC **A07**/MF **A01**
Lyon-1 Univ., 69 - Villeurbanne (France). Inst. de Physique Nucleaire.
Study of Some Excited States in exp 21 Ne- exp 21 Na, exp 18 O- exp 18 F and exp 15 N- exp 15 O Nuclei.
D. Drain. 1977, 129p
In French.Thesis.
U.S. Sales Only.

The study of exp 21 Ne- exp 21 Na, exp 18 O- exp 18 F and exp 15 N- exp 15 O nuclei was performed through proton capture and transfer reactions and allows one to determine the spins and parities of some excited states, give the gamma deexcitation schemes of these levels, and compute the neutron and proton reduced widths gamma exp 2 /sub n/ and gamma exp 2 /sub p/. The levels studied are the following: in exp 21 Na 4.15<=E(exc)<=6.2MeV (exp 20 Ne(p,p), (p,p'), (p,p' gamma) and (p gamma) reactions) and in exp 21 Ne: E(exc)=4.73, 5.69 and 5.76 MeV (exp 20 Ne (p,p) reaction); in exp 18 O: E(exc)<=5.37 MeV (exp 17 O(d,p) reaction); in exp 15 O: 8.92 MeV doublet and 8.98 MeV level (angular correlation exp 14 N(p, gamma gamma) and in exp 15 N: 9.05<=E(exc)<=10.45 MeV (exp 14 N(d,p) reaction). A comparison with theoretical results is discussed and analog states are pointed out. (Atomindex citation 09:410371)

LYCEN-7736 PC **A08**/MF **A01**
Lyon-1 Univ., 69 - Villeurbanne (France). Inst. de Physique Nucleaire.
Spectroscopic Study of the exp 80 Br and exp 82 Br Isotopes by (N, gamma) and (P,N gamma) Reactions.
1977, 155p
In French.Thesis.
U.S. Sales Only.

The level structures of the odd-odd nuclei in the region between 28 and 50 nucleons are unknown or uncertain. The excited states of exp 80 Br, exp 82 Br were studied using the exp 79 Br, exp 81 Br(n, gamma) and exp 80 Se, exp 82 Se(p,n gamma) reactions. Neutron capture gamma -rays and conversion electrons from isotopically separated targets were measured using three bent crystal spectrometers, a pair and anti-Compton spectrometer and beta-spectrometer at the Grenoble HFR. Gamma-gamma coincidences were taken at the KFA-FRJ2 reactor. Excitation functions and angular distributions from the (p,n gamma) reactions were investigated at the 4 MeV Van de Graaff accelerator in Lyon. With all these data the level schemes of exp 80 Br, exp 82 Br are proposed up to 1.5 MeV; spin assignments for the excited states below 800 keV are proposed. The low-lying states in exp 80 Br, exp 82 Br should result from the interaction between the odd-neutron and odd-proton. These states could be interpreted in terms of shell model configurations or in terms of Nilsson configurations. (Atomindex citation 09:410369)

LYCEN-7748 PC **A03**/MF **A01**
Lyon-1 Univ., 69 - Villeurbanne (France). Inst. de Physique Nucleaire.
Energy Dissipation in Light Heavy Ion Reactions.
R. Billerey, C. Cerruti, A. Chevarier, N. Chevarier, and A. Demeyer. 1977, 26p
U.S. Sales Only.

Analysis of the energy dissipation for light heavy ion (exp 12 C, exp 14 N, exp 16 O, exp 22 Ne) reactions has been attempted. Classical models with or without a friction term and the diffusion model have been compared to the data. Fragmentation and prompt collective excitation have been considered also. (Atomindex citation 09:416408)

PUB-3005 PC **A03**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Table of Specific Activities of Selected Isotopes.
G. Shipley. 43p
Contract W-7405-ENG-48

The bulk of this publication consists of a table of the half-lives, decay modes, and specific activities of isotopes selected for their particular interest to the Environmental Health and Safety Department, LBL. The specific activities were calculated with a PDP 9/15 computer. Also included in the report is a table of stable isotopes, the Th and U decay chains, a chart of the nuclides for elements 101 through 106, the heavy element region of the periodic table, and a specific activity monograph. 5 figures, 2 tables. (ERA citation 04:052314)

RI-26 PC **A03**/MF **A01**
Radievyi Inst., Leningrad (USSR).
Recommendations for Construction of Radioactive Nucleus Decay Schemes (To Be Published in 1974--1977).
B. S. Dzhelepov, A. G. Dmitriev, N. N. Zhukovskii, R. B. Ivanov, and M. A. Mikhailova.
1974, 38p
In Russian.
U.S. Sales Only.

The paper contains recommendations for unifying the decay schemes of radioactive nuclei. The collected schemes are supposed to be published in 1974-1977. In other editions the unification is also desirable since it simplifies reading and comparison of schemes. (Atomindex citation 09:406641)

SLAC-PUB-2177 PC **A09**/MF **A01**
Stanford Linear Accelerator Center, CA.
Weak Interactions at High Energies.
J. Ellis. Aug 78, 199p
Contract EY-76-C-03-0515

Review lectures are presented on the phenomenological implications of the modern spontaneously broken gauge theories of the weak and electromagnetic interactions, and some observations are made about which high energy experiments probe what aspects of gauge theories. Basic quantum chromodynamics phenomenology is covered including momentum dependent effective quark distributions, the transverse momentum cutoff, search for gluons as sources of hadron jets, the status and prospects for the spectroscopy of fundamental fermions and how fermions may be used to probe aspects of the weak and electromagnetic gauge theory, studies of intermediate vector bosons, and miscellaneous possibilities suggested by gauge theories from the Higgs bosons to speculations about proton decay. 187 references. (ERA citation 04:028343)

UCID-17271-79 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
E-Division Activities Report.
H. H. Barschall. Jul 79, 44p
Contract W-7405-ENG-48

This report describes some of the activities in E (Experimental Physics) Division during the past year. E-Division carries out research and development in areas related to the missions of the Laboratory. Many of the activities are in pure and applied atomic and nuclear physics. In addition, this report describes work on accelerators, radiation damage, microwaves, and plasma diagnostics. (ERA citation 04:052304)

20I. Plasma Physics

AD-A076 121/3 PC **A09**/MF **A01**
Stanford Univ Ca Inst for Plasma Research
Evolution of Turbulence by Three-Dimensional Numerical Particle-Vortex Tracing.
Benoit Couet. Aug 79, 190p Rept no. SU-IPR-793
Contract N00014-78-C-0272

A new method for the numerical simulation of three-dimensional incompressible flows is described. Our vortex-in-cell (VIC) method traces the motion of the vortex filaments in the velocity field which these filaments create. The velocity field is not calculated by creating a mesh-record of the vorticity field, then integrating a Poisson's equation via the fast Fourier transform to get the stream function and generating a mesh-record of the velocity field. The computed scales of motion are assumed to be essentially inviscid. Viscous or subgrid-scale effects are incorporated into a filtering procedure in wave vector space. Three computational experiments were pursued in three-dimensional space. The velocity of translation of a single vortex ring was measured and compared with the Biot-Savart law. Next, the evolution in time of an infinite periodic array of closed vortex filaments (Taylor-Green) was studied. The third simulation follows a mixing layer from an initial state of uniform vorticity with two- and three-dimensional small perturbations. Streamwise perturbations lead to the usual roll-up of vortex patterns with spanwise uniformity.

AD-A076 154/4 PC **A03**/MF **A01**
Naval Research Lab Washington Dc
Electromagnetic Instabilities in a Focused Ion Beam Propagating through a z-Discharge Plasma.
Interim rept.,
P. F. Ottinger , D. Mosher , and Shyke A. Goldstein. 15 Oct 79, 26p Rept no. NRL-MR-4088
Contract ES-77-A-01-6021

A beam-plasma system consisting of a focused light ion beam propagating through a z-discharge plasma is analyzed for electromagnetic velocity space instabilities. In particular, the Weibel and the Whistler instabilities are studied. It is found that unstable modes do not grow fast enough to affect the beam propagation in a pellet-fusion-reactor chamber.

COO-2387-101 PC **A10**/MF **A01**
Wisconsin Univ.-Madison.
Convective Cells and Their Relationship to Vortex Diffusion in the Wisconsin Levitated Octupole.
A. B. Ehrhardt. 1978, 208p
Contract EY-76-S-02-2367
Thesis.

The purpose of this thesis is two-fold: first, to present floating potential structure for different plasmas and operating parameters in the Wisconsin Levitated Octupole. Second, to show how the observed potential structure can be used, within the framework of vortex diffusion, to account for enhanced diffusion in the appropriate parameter regimes. (ERA citation 04:050854)

N80-10914/3 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Washington, D. C.
Establishment of the Spectra of Kinetic Turbulence.
L. A. Bolshov, A. M. Dykhne, V. P. Kiselev, and A. K. Pergament. Aug 79, 28p NASA-TM-75666

Contract NASW-3199
Tran-Transl. Into English of "Ustanovieniye Spektrov Kineticheskoy Turbulentinosti" (Moscow), Preprint No. 31, 1979 30 p. Subm-Transl. By Kanner (Leo) Associates, Redwood City, Calif. Original DOC. Prepared by Academy of Sciences (Ussr), Moscow.

An analysis of kinetic equations describing the establishment of Langmuir turbulence spectra is presented. Secondary turbulence occurs where stationary distribution consists of many peaks. The position of peaks is established and their amplitudes complete undamped oscillations. It is pointed out that establishing spectra can occur only during adiabatic inclusion of pumping. It is significant here that the adiabiatic condition is more rigid than the ordinary by several hundred times.

N80-10915/0 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, D. C.
Numerical Experiments on the theta Pinch.
P. P. Volosevich, and G. G. Zukakishyili. Oct 79, 18p NASA-TM-75694
Contract NASW-3199
Tran-Transl. Into English of "Chislennyye Eksperimenty Po Teta-Pinchu", Prep. No. 47 Acad. Of Sci. Ussr, Inst. Of Appl. Math., Moscow, 1979 p 1-30. Subm-Transl. By Kanner (Leo) Associates, Redwood City, Calif.

Numerical calculation of theta pinch problems are presented. Physical processes in theta pinch systems are considered in a one dimensional, two temperature magnetohydrodynamic, approximation with allowance for end losses by longitudinal heat conductivity. The numerical calculations are compared with results of earlier experiments.

Rijnhuizen-78-110 PC **A03**/MF **A01**
Stichting voor Fundamenteel Onderzoek der Materie, Jutphaas (Netherlands). Inst. voor Plasma-Fysica.
Neutral Density in a Hydrogen Arc.
W. J. Goedheer. Sep 78, 45p
U.S. Sales Only.

A method to calculate the neutral density in a hydrogen plasma by means of a reduced set of rate equations is presented. The plasma is assumed to be optically thin, so that the only radiative transitions are spontaneous de-excitation and radiative recombination. In the collisional transitions only interaction with electrons is taken into account. After a description of the method it is applied to a hydrogen arc. The influence of deviations from local thermodynamic equilibrium on the temperature and pressure profiles of an infinitely long cylindrically symmetric hydrogen arc with an externally applied axial magnetic field is studied. (Atomindex citation 10:434302)

UCRL-82296 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Prospects for Generating 1-10 TPa Pressures with a Railgun.
R. S. Hawke, and J. K. Scudder. 13 Jul 79, 6p CONF-790709-4
Contract W-7405-ENG-48
VII international AIRAPT conference, La Creusot, France, 30 Jul 1979.

It has been demonstrated that a plasma arc can be accelerated along two current carrying parallel rails and used to accelerate a projectile. We have performed an extensive analysis and found the task of using a railgun to accelerate an impactor plate to velocities of 10 to 40 km/s to be feasible with contemporary technology. This range of impact velocities would enable shock pressures of 1 to 10 TPa to be generated for EOS research. (ERA citation 04:050850)

UCRL-82793 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Brillouin Scatter in a Hydrodynamic Simulation.
J. Harte, K. Estabrook, and D. Bailey. 8 Jun 79, 15p CONF-790675-2
Contract W-7405-ENG-48
Annual conference on transport processes in laser plasmas, Traverse City, MI, USA, 18 Jun 1979.

A numerical method for modeling stimulated Brillouin scatter (SBS) in a hydrodynamic simulation code is discussed. Preliminary results using the model show that scattering is reduced as shorter wavelengths are used and for spherical symmetry that ion heating by SBS is not significant since the ions cool by expansion. (ERA citation 04:050908)

20K. Solid Mechanics

AD-A075 780/7 PC **A03**/MF **A01**
State Univ of New York At Buffalo Dept of Engineering Science Aerospace Engineering and Nuclear Engineering
Creep Damage under One-Dimensional Variable Tensile Stress.
Summary rept.,
F. A. Cozzarelli , and G. Bernasconi. Sep 79, 33p Rept no. 114
Contract N00014-75-C-0302

A nonlinear damage relation, containing the axial strain history and a time integral over the stress history, is proposed for the case of one-dimensional time dependent tensile stress. Nonlinear steady and transient creep terms are included in the axial strain relation, and elastic and creep Poisson's ratios are introduced into the lateral strain relation. Using these relations, complete damage solutions are obtained for the constant stress rate, step stress, relaxation and constant load tests. Observations are made concerning the associated rupture times. (Author)

AD-A075 944/9 PC **A02**/MF **A01**
Naval Postgraduate School Monterey Ca
Vibration of a Cantilever Beam that Slides Axially in a Rigid Frictionless Hole.
Technical rept.,
Arthur P. Boresi , and David Salinas. Sep 79, 24p Rept no. NPS-69-79-009

This paper considers a cantilever beam which can move in and out of a rigid frictionless hole. Hamilton's principle is used for the development of two governing equations, and boundary conditions defined over a moving boundary. A transformation of coordinates is used to transform the problem into a system of two nonlinear p.d.e. defined over a fixed region. A discussion of some mathematical and physical considerations is presented. Finally, a finite element formulation of the problem is presented. (Author)

AD-A076 185/8 PC **A08**/MF **A01**
Pennsylvania State Univ University Park Applied Research Lab
Vibration of Plates of Various Geometries.
Doctoral thesis,
Earl G. Williams. 17 Jun 79, 157p Rept no. ARL/PSU/TM-79-130
Contract N00024-79-C-6043

Point driven, flat, thin aluminum plates of various geometries with free boundaries are studied in this thesis. We have applied a theory which allows the mean of the driving point admittance to be predicted over a wide frequency range at any point on these plates. This prediction is compared to the experimentally determined admittance. Also, the expected minimum and maximum variations about this mean and predicted and compared to the experimental data over a broad frequency range. Measured loss factors for these free plates were used in the theoretical models. The actual admittance versus frequency for a center driven rectangular plate was predicted using a mode sum technique and compared to measured data. A simple algebraic formula was used to predict the resonance frequencies of the rectangular and square plates with free boundaries. The transfer admittance of these point driven plates was also measured experimentally and compared to a theory which predicts the mean admittance versus frequency. The dependence of this mean on plate size and also on plate damping was demonstrated. (Author)

COO-2733-24 PC **A03**/MF **A01**
Cornell Univ., Ithaca, NY. Dept. of Theoretical and Applied Mechanics.
Inelastic Analysis of Transverse Deflection of Plates by the Boundary Element Method.
M. Morjaria, and S. Mukherjee. Jun 79, 50p
Contract EY-76-S-02-2733

A numerical scheme for time-dependent inelastic analysis of transverse deflection of plates of arbitrary shape by the boundary element method is presented. The governing differential equation is the inhomogeneous biharmonic equation for the rate of small transverse deflection. This complicated boundary value problem for an arbitrarily shaped plate is solved by using a novel combination of the boundary element method and finite element methodology. The number of unknowns, however, depends upon the boundary discretization and is therefore less than in a finite element model. A combined creep-plasticity constitutive theory with state variables is used to model material behavior. The computer code developed can solve problems for an arbitrarily shaped plate with clamped or simply supported boundary conditions and an arbitrary loading history. Some illustrative numerical results for clamped and simply supported rectangular and triangular plates, under various loading histories, are presented and discussed. (ERA citation 04:053523)

COO-3084-65 PC **A04**/MF **A01**
Brown Univ., Providence, RI. Div. of Engineering.
Elastic Plastic Analysis of Growing Cracks.
J. R. Rice, W. J. Drugan, and T. L. Sham. May 79, 55p CONF-7905104-1
Contract EY-76-S-02-3084
12. annual symposium on fracture mechanics, St Louis, MO, USA, 21 May 1979.

The elastic--plastic stress and deformation fields at the tip of a crack which grows in an ideally plastic solid under plane strain, shows small scale yielding conditions. Results of an asymptotic analysis suggests the existence of a crack tip stress state similar to that of the classical Prandtl field, but containing a zone of elastic unloading between the centered fan region and the trailing constant stress plastic region. The near tip expression for the rate of opening displacement delta at distance r from the growing tip is found to have the form delta-. = alpha J-./sigma/sub o/ + beta (sigma/sub o//E) e-. ln(R/r) but the presence of the elastic wedge causes beta to have the revised value of 5.08 (for Poisson ratio nu = 0.3); also, (a = crack length, sigma/sub o/ = yield strength, E = elastic modulus, and J denotes the far-field value), and (1-nu exp 2)K exp 2 /E for the small scale yielding conditions considered. The parameters alpha and R cannot be determined from the asymptotic analysis, but comparisons with finite element solutions suggest that, for small amounts of growth, alpha is approximately the same for stationary and growing cracks, and R scales approximately with the size of the plastic zone, being about 15% to 30% larger. For large scale yielding, a similar form applies with possible variations in alpha and beta , in cases which maintain triaxial constraint at the crack tip. In the fully yielded case R is expected to be proportional to the dimension of the uncracked ligament. Model crack growth criterion requiring a critical delta at some fixed r from the tip, is re-examined in light of the more accurate solution. Results suggest that the J versus delta a relation describing growth is dependent on the extent of yielding. It is suggested that this dependency might be small for highly ductile materials, provided that a similar triaxial constraint is maintained in all cases. (ERA citation 04:051929)

N80-10514/1 PC **A02**/MF **A01**
Engineering Information Systems, Inc., San Jose, Calif.
User's Guide: Spar Processor MN Analysis of Inelastic Three-Dimensional Solids, Part 2.
W. D. Whetstone, and C. E. Jones. Sep 79, 16p NASA-CR-161321, EISI/A3088
Contract NAS8-32365

A user's guide to the processor MN is presented. The processor MN is used to analyze systems in which some or all of the three dimensional elements have nonlinear stress-strain relations. Representations of nonlinear material behavior implemented into the system are provided including Von Mises yield criterion, the Prandtl-Reuss flow rule, and the mechanical sublayer method. The primary data sets used to represent the state of the system are presented.

20L Solid-State Physics

AD-A075 628/8 PC **A02**/MF **A01**
Rome Air Development Center Hanscom AFB Ma Deputy for Electronic Technology
Transmission Electron Microscope Observations of Damage in InP Induced during Handling,
J. J. Comer. 13 Dec 78, 4p Rept no. RADC/ETR-79-0022
Pub. in Jnl. of Applied Physics, v50 n9 p6003-6005 Sep 79.

No abstract available.

AD-A075 659/3 PC **A03**/MF **A01**
Catholic Univ of America Washington D C Dept of Physics
Resonant Scattering of Elastic Waves from Spherical Solid Inclusions.
Technical rept. 1 Feb 79-31 Jun 80,
Lawrence Flax , and Herbert Ueberall. 27 Sep 79, 44p
Contract N00014-76-C-0430

Previous investigations concerning the scattering of elastic waves from solid spherical inclusions have furnished expressions for the scattering cross sections which, upon numerical evaluation, exhibited resonance-like features as a function of frequency. In the present work, we study these resonances in a fashion suggested by the resonance theory of acoustic scattering. The resonances of the solid inclusions, exemplified by iron or lucite spheres imbedded in an aluminum matrix, are found numerically in the individual normal-mode scattering amplitudes, and are interpreted in terms of phase-matched circumferential waves. Dispersion curves for the phase velocities of the latter are obtained, exhibiting two families of waves of different type. Finally, the connection of these waves with the Stoneley waves on the boundary between two flat half-spaces is noted in the high-frequency limit.

AD-A075 738/5 PC **A02**/MF **A01**
State Univ of New York At Buffalo Dept of Engineering Science Aerospace Engineering and Nuclear Engineering
A General Uniqueness Theorem in Nonlinear Viscoelasticity with Application to Temperature and Irradiation Induced Creep Problems.
Summary rept.,
Georges A. Becus , and F. A. Cozzarelli. Aug 79, 23p Rept no. 112
Contract N00014-75-C-0302

A general uniqueness theorem is first derived for a general constitutive relation in the form of a nonlinear memory integral with aging included. Uniqueness is proved for the solution to the dynamic mixed boundary value problem with small deformations. The general theorem is then specialized to a constitutive equation of the isotropic power law type governing thermoirradiation induced creep. (Author)

AD-A075 812/8 PC **A03**/MF **A01**
Texas Univ At Austin Dept of Chemistry
Semiconductor Electrodes 25. The p-GaAs/Heptyl Viologen System. Photoelectrochemical Cells and Photoelectrochromic Displays.
Technical rept. 1 Sep 79-31 Aug 80,
Benjamin Reichman , Fu-Ren F. Fan , and Allen J. Bard. 1 Oct 79, 30p Rept no. TF:-2
Contract N00014-78-C-0592
See also AD-A075 813.

The photoreduction of aqueous solutions of 1,1'-diheptyl-4,4'-bipyridyl (heptyl viologen, HV(2+)) bromide on p-GaAs was investigated. Under irradiation with light of wavelengths below 885 nm, the photoreduction of HV(2+) to form a precipitate of violet HVBr occurs on p-GaAs at a potential of approx 400 mV more positive than the reversible potential of the HV(2+)/HVBr couple on Pt. Oxidation of HVBr back to soluble HV(2+) occurs in the dark at more negative potentials. Photoelectrochemical low capacity storage cells based on this reaction with Cu, Ni, or HxNb2O5 counter electrodes were constructed. In such cells, under illumination, the p-GaAs electrode behaves as the cathode, a photovoltage develops and current flows in the external circuit, while HVBr precipitates on the electrode surface and the counter electrode is oxidized. In the dark, the current flows in the opposite direction, the p-GaAs is the anode and reduction occurs at the counter electrode. Such a cell also produces an alternating electrical output under periodic illumination. Photoelectrochromic cells based on this reaction and utilizing simultaneous addressing with light and electrical signals are also proposed. (Author)

AD-A075 813/6 PC **A03**/MF **A01**
Texas Univ At Austin Dept of Chemistry
Semiconductor Electrodes. 27. The p- and n-GaAs- N,N'-Dimethyl-4,4'-Bipyridinium System. Enhancement of Hydrogen Evolution on p-GaAs and Stabilization of n-GaAs Electrodes.
Technical rept. 1 Sep 79-31 Aug 80,
Fu-Ren F. Fan , Benjamin Reichman , and Allen J. Bard. 1 Oct 79, 26p Rept no. TR-3
Contract N00014-78-C-0592
See also, AD-A075 812.

The photoelectrochemical (PEC) behavior of N,N'-dimethyl-4,4'-bipyridinium (methyl viologen,MV (2+) at p- and n-type GaAs electrodes in aqueous solutions was studied. The reduction of MV(2+) at irradiated p-GaAs occurs at potentials approx. 450 mV less negative than those found at Pt electrode. The catalyzed reaction of the Photogenerated MV with water to produce hydrogen by irradiation of p-GaAs was demonstrated and the use of the MV-system as an intermediate in the photoassisted generation of hydrogen at semiconductors with high hydrogen over potentials suggested. The photooxidation of MV at n-GaAs occurred at potentials approx. 0.8 V less positive to those where the oxidation takes place at Pt. PEC cells of the form n-GaAs or p-GaAs/MV(2+),MV/M were also constructed. (Author)

AD-A075 828/4 Not available NTIS
Royal Military Coll of Canada Kingston (Ontario)
The Effect of an Applied Transverse Magnetic Field on the Flow Stress of Superconducting Lead,
T. S. Hutchison , and S. L. McBride. 22 Oct 74, 4p
Summary in French.
Availability: Pub. in Canadian Jnl. of Physics, v53 n10 p945-947 1975 (No copies furnished by DTIC).

No abstract available.

AD-A075 906/8 PC **A02**/MF **A01**
Army Electronics Research and Development Command Fort Monmouth Nj Electronics Technology/Devices Lab
Enhancement of the Magnetic Properties of the Samarium-2 Copper-1.6 Zirconium-0.16 Iron-3.3 Cobalt-12 Compound,
R. L. Bergner , H. A. Leupold , J. T. Breslin , J. R. Shappirio , and A. Tauber. Sep 79, 8p Rept no. DELET-TR-79-21
Pub. in Jnl. of Applied Physics, v50 p2352-2354 Mar 79. Presented at the Annual Conference on Magnetic Materials (24th), Cleveland, OH, 14-17 Nov 78.

No abstract available.

AD-A075 907/6 PC **A02**/MF **A01**
Army Electronics Research and Development Command Fort Monmouth Nj Electronics Technology/Devices Lab
Temperature Dependence of the Magnetic Parameters in the Gadolinium and Manganese Substituted Samarium-2 Cobalt-17 Compounds,
R. L. Bergner , H. A. Leupold , J. T. Breslin , F. Rothwarf , and A. Tauber. Sep 79, 8p Rept no. DELET-TR-79-22
Pub. in Jnl. of Applied Physics, v50 p2349-2351 Mar 79. Presented at the Annual Conference on Magnetic Materials (24th) Cleveland, OH, 14-17 Nov 78.

No abstract available.

AD-A075 935/7 Not available NTIS
State Univ of New York At Albany Dept of Physics
Iterative EHT Calculations for the Positive Divacancy in Silicon,
Christoph Weigel , and C. A. J. Ammerlaan. 17 May 79, 13p
Contract N00014-C-75-0919
Availability: Pub. in Physica Status Solidi (b). Basic Research, v13 n4 p505-516 1979 (No copies furnished by DTIC).

No abstract available.

AD-A075 936/5 PC **A02**/MF **A01**
Rensselaer Polytechnic Inst Troy NY Dept of Electrical and Systems Engineering
Transverse-Acoustoelectric-Voltage (TAV) Spectroscopy of High-Resistivity GaAs,
H. Estrada-Vazquez , R. T. Webster , and P. Das. 28 Mar 78, 12p Rept no. MA-ONR-26
Contract N00014-75-C-0772
Pub. in Jnl. of Applied Physics, v50 n7 p4942-4950 Jul 79.

No abstract available.

AD-A075 937/3 PC **A02**/MF **A01**
Rensselaer Polytechnic Inst Troy Ny Dept of Electrical and Systems Engineering
Study of the Surface Properties of Thermally Oxidized Silicon using Surface Acoustic Wave Attenuation,
R. T. Webster , H. Estrada-Vazquez , and P. Das. 8 Mar 78, 10p Rept no. MA-ONR-25
Contract N00014-75-C-0772, Grant AFOSR-77-3426
Pub. in Solid-State Electronics, v22 p541-548 1979.

No abstract available.

AD-A076 027/2 PC **A04**/MF **A01**
California Inst of Tech Pasadena Div of Engineering and Applied Science
Anti-Plane Shear Fields with Discontinuous Deformation Gradients Near the Tip of a Crack in Finite Elastostatics.
Research rept.,
J. K. Knowles , and Eli Sternberg. Sep 79, 71p
Contract N00014-75-C-0196

This paper reconsiders the problem of determining the elastostatic field near the tip of a crack in an all-around infinite body deformed by a 'Mode III' loading at infinity to a state of anti-plane shear. The problem is treated for a class of incompressible, homogeneous, isotropic elastic materials whose constitutive laws permit a loss of ellipticity in the governing displacement equation of equilibrium at sufficiently severe shearing strains. The analysis represents a generalization of that reported in an earlier study and, as before, is carried out for the 'small-scale nonlinear crack problem', in which a crack of finite length is replaced by a semi-infinite one, and the nonlinear field far from the crack-tip is matched to the near field predicted by the linearized theory. The methods employed in the present paper are necessarily largely qualitative, since they apply to all materials in the class considered. The principal feature of the resulting elastic field is the presence of two symmetrically located curves issuing from the crack-tip and bearing discontinuities in displacement gradient and stress. (Author)

AD-A076 149/4 PC **A03**/MF **A01**
Texas Univ At Austin Dept of Chemistry
Semiconductor Electrodes. 26. Spectral Sensitization of Semiconductors with Phthalocyanine.
Technical rept.,
Calvin D. Jaeger , Fu-Ren F. Fan , and Allen J. Bard. 31 Oct 79, 30p Rept no. TR-4
Contract N00014-78-C-0592
See also AD-A075 813.

Spectral sensitization by metal-free phthalocyanine (H2Pc) films was observed on various semiconductor electrodes (single crystal n-TiO2, n-SrTiO3, n-WO3, n-ZnO, n-CdS, n-CdSe, n0Si, and n-GaP; SnO2 conducting glass). The spectral response of the sensitized photocurrent was generally the same as the absorption spectrum of the phthalocyanine. The rather thick (400 A to 1 micron H2Pc films showed both anodic and cathodic photocurrents depending upon the applied potential. The anodic photocurrents represented the usual sensitization of the n-type semiconductor, while the cathodic photocurrents were attributed to p-type behavior of the phthalocyanine itself. The current-potential curves of the semiconductor electrodes depended on the nature of the H2Pc

film, the presence of a redox couple (i.e., p-hydroquinone/p-benzoquinone) in solution and the wavelength of the irradiating light. The magnitude of the steady state sensitized photocurrent was linear with light intensity and was strongly affected by the addition of the supersensitizer. (Author)

AD-A076 171/8 PC **A02/MF A01**
Army Armament Research and Development Command Watervliet Ny Large Caliber Weapon Systems Lab
Giant Magnetism in Pressure Quenched Cadmium Sulfide.
Technical rept.,
R. K. MacCrone , and C. G. Homan. Sep 79, 16p ARLCB-TR-79023, AD-E440 049

Large positive magnetism (paramagnetism) is reported in poly-crystalline CdS samples pressure quenched from above the semiconducting-conducting phase transition. This positive magnetism reaches a maximum magnetization approaching four gauss at fields between five and twelve KOe. (Author)

AD-A076 202/1 PC **A04/MF A01**
Pennsylvania State Univ University Park Materials Research Lab
Magnetoferroelectrics, Divertable Ferroelectrics and Pyroelectric Glass Ceramics.
Final rept. 22 Mar 76-21 Jun 79,
R. E. Newnham , L. E. Cross , W. A. Schulze , and A. S. Bhalla. 21 Jun 79, 66p ARO-13731.4-P Grant DAAG29-76-G-0145

The highlight of the past three years was the discovery of magnetoferroelectricity, a new type of ferroelectricity caused by the ordering of magnetic spins in a low symmetry arrangement. A magnetoferroelectric develops a reversible spontaneous electric polarization on passing through a magnetic phase transition. The effect was demonstrated on Cr2BeO4 which undergoes a phase transformation from a centric paramagnetic state to a complex antiferromagnetic state at 28K. Ceramic specimens can be poled electrically below the transition temperature to a remnant polarization about five oders of magnitude smaller than BaTiO3. Additional magnetoferroelectric studies have been carried out on single crystals of CrBeO4 and on certain mixed crystals in the Fe2O3-Cr2O3 system. Second harmonic signals were observed from PbZrO3 ceramics, verifying the acentric nature of this important end member of the PZT system. Divertable ferroelectrics are an interesting group of materials in which the spontaneous polarization can be reoriented, but not reversed. The results of some experiments on nickel iodine boracite, and on barium titanium germanate are described. A new class of pyroelectric materials is reported. Carefully crystallized lithium silicate glass-ceramics are found to be pyroelectric.

AD-A076 243/5 Not available NTIS
Mcgill Univ Montreal (Quebec) Dept of Electrical Engineering
Various Forms of High Electric Field Domains in Photoconducting CdS Samples,
Tibor Zold. 10 Sep 73, 4p DRB-REPRINT-4045
Availability: Pub. in IEEE Transactions on Sonics and Ultrasonics, vSU-21 n2 p136-139 Apr 74 (No copies furnished by DTIC).

No abstract available.

AD-A076 244/3 Not available NTIS
Mcgill Univ Montreal (Quebec) Dept of Electrical Engineering
Development of High Electric Field Domains Under Varying Drift Field Conditions in Photoconducting CdS Samples,
Tibor Zold. 8 Feb 73, 8p DRB-REPRINT-4046
Availability: Pub. in IEEE Transactions on Sonics and Ultrasonics, vSU-21 n1 p33-40 Jan 74 (No copies furnished by DTIC).

No abstract available.

AD-A076 245/0 Not available NTIS
Mcgill Univ Montreal (Quebec) Dept of Electrical Engineering
Nucleation of Moving Acoustoelectric Domains,
Tibor Zold. 2 Dec 71, 8p
Availability: Pub. in Jnl. of Applied Physics, v43 n9 p3670-3677 Sep 72 (No copies furnished by DTIC).

No abstract available.

AD-A076 251/8 PC **A02/MF A01**
Stanford Univ Ca Edward L Ginzton Lab
Recount of Program on Acoustic Microscopy at Stanford. Acoustic Microscopy Symposium-Workshop, Indianapolis Center for Advanced Research, Indianapolis, Indiana, February 14-18, 1977.
Internal memo.,
C. F. Quate. 1977, 24p Rept no. GL-2689
Contracts N00014-75-C-0632, NBS5-35899

The work began in the early sixties with an exploration of bulk acoustic waves in high-quality crystals such as Lithium Niobate and piezoelectric semiconductors such as Cadmium Sulphide. The work with Niobate was focused on acousto-optic interactions and a number of devices such as acousto-optic modulators and optical filters and surface wave convolvers have evolved from this initial work. It was the Zinc Oxide thin film transducer that allowed us to enter this domain of technology. We acquired the capacity to fabricate these transducers in a manner that gave us efficient conversion of electromagnetic energy into acoustic energy over a wide band of frequencies. It also permitted us to work at frequencies above 1000 MHz. In liquids the acoustic wavelength of 1.5 microns is in the neighborhood of optical wavelengths. It was natural to think about microscopes based on this form of radiation. Perhaps the resolution would equal or exceed the resolution of the optical instrument.

AD-A076 304/5 PC **A12/MF A01**
Stanford Univ Calif Stanford Electronics Labs
Study of the Electronic Surface State of III-V Compounds.
Final technical rept.,
W. E. Spicer. 15 Oct 78, 259p
Contract DAAK02-74-C-0069, DARPA Order-2182

In the past few years, we have made intensive studies of the physics of compound semiconductor interfaces. This report contains the most important results obtained during the contact period and is divided roughly into three parts dealing with Schottky-barrier formation, oxygen chemisorption, and cesium and cesium oxide overlayers. Following the Overview, Chapter 2 presents a model for the surface structure of GaAs which in now accepted. The next chapter demonstrates that Schottky-barrier pinning is due not to intrinsic surface states but to metal induced extrinsic states. Chapter 4 describes synchrotron radiation studies of Au Schottky-barrier formaton on the IV-V semiconductors and presents a model of Schottky-barrier pinning based on defect formation induced by the Au overlayer. (Author)

BNL-25984 PC **A03/MF A01**
Brookhaven National Lab., Upton, NY.
Neutron Scattering Studies of Pretransitional Phenomena in Structural Phase Transformations.
S. M. Shapiro. Mar 79, 34p CONF-790219-10
Contract EY-76-C-02-0016
AIME annual meeting, New Orleans, LA, USA, 18 Feb 1979.

Materials exhibiting structural phase transformations are well known to possess pretransitional phenomena. Below the transition temperature, T/sub c/, an order parameter appears and the pretransitional effects are associated with the fluctuations of the order parameter. Neutron scattering techniques have proved invaluable in studying the temporal and spatial dependence of these fluctuations. SrTiO sub 3 is the prototypical example of a structural phase transformation exhibiting features observable in other transformations such as martensitic and order-disorder. The experimental evolution of the understanding of the phase transformation in SrTiO sub 3 will be reviewed and the features observed will be shown to typify other systems. (ERA citation 04:050379)

BNL-26424 PC **A02/MF A01**
Brookhaven National Lab., Upton, NY.
Direct Observation of Defects in A15 Compounds Produced by Fast Neutron Irradiation.
C. S. Pande. 1979, 8p CONF-790653-9
Contract EY-76-C-02-0016
Superconductivity in d- and f-band metals, San Diego, CA, USA, 21 Jun 1979.

The nature of defect or defect complexes produced in superconducting compounds Nb sub 3 Sn, Nb sub 3 Pt, and V sub 3 Si by high energy (E greater than or equal to 1 MeV) neutron irradiation is investigated by transmission electron microscopy. The newly developed technique of superlattice reflection imaging is used whereby the regions of reduced long range order are directly imaged. Unlike metals these regions were found in general not to collapse into dislocation loops. The size and the volume fraction of these disordered regions are obtained for fluences ranging from 10 exp 17 neutrons/cm exp 2 to 3 x 10 exp 19 neutrons/cm exp 2 . The size ranges from 20A to 60A. Typical volume fraction for 10 exp 18 neutrons/cm exp 2 is over 1%. (ERA citation 04:050342)

BNL-26432 PC **A02/MF A01**
Tata Inst. of Fundamental Research, Bombay (India).
Linear Chain of Classical Heisenberg Spins with Three or Four Spin Interactions.
M. Barma. 1979, 7p CONF-790909-1
Contract EY-76-C-02-0016
International conference on magnetism, Munich, F.R. Germany, Sep 1979.

The free energy of a classical Heisenberg chain with three or four spin interactions is shown to equal that of a spin-infinity Ising model. The two-spin Heisenberg correlation function equals a many-spin Ising correlation function and can oscillate with distance. (ERA citation 04:049358)

BNL-26441 PC **A02/MF A01**
Brookhaven National Lab., Upton, NY.
Density of States and T/sub C/ of Disordered A15 Compounds.
A. K. Ghosh, and M. Strongin. 1979, 12p CONF-790653-10
Contract EY-76-C-02-0016
Superconductivity in d- and f-band metals, San Diego, CA, USA, 21 Jun 1979.

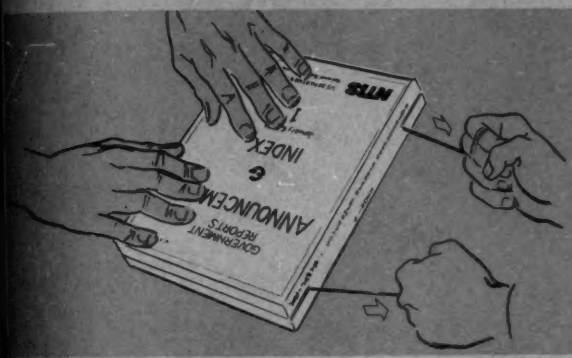
In this paper various data for the depression of T/sub c/ and N(O) are presented for a wide class of A15 materials. The question of disorder and the limits on T/sub c/ in these materials are discussed. (ERA citation 04:050814)

BNL-26442 PC **A02/MF A01**
Brookhaven National Lab., Upton, NY.
Experimental Study of Induced Staggered Magnetic Fields in Dysprosium Gallium Garnet (DGG).
M. Steiner, L. M. Corliss, J. M. Hastings, M. Blume, and N. Giordano. 1979, 7p CONF-790909-3
Contract EY-76-C-02-0016
International conference on magnetism, Munich, F.R. Germany, Sep 1979.

Neutron diffraction techniques have been used to study induced staggered magnetic field effects in DGG. The application of a uniform magnetic field at temperatures much greater than the Neel temperature induces a significant amount of antiferromagnetic order. The temperature and field dependences of this effect are in good agreement with recent theoretical predicions. (ERA citation 04:051991)

CONF-790620-2 PC **A02/MF A01**
Oak Ridge National Lab., TN.
Symmetry Properties of the Transport Coefficients of Charged Particles in Disordered Materials.
J. K. Baird. 1979, 8p
Contract W-7405-ENG-26
Dundee conference on application of numerical analysis, Dundee, UK, 26 Jun 1979.

The transport coefficients of a charged particle in an isotropic material are shown to be even functions of the applied electric field. We discuss the limitation which this result and its consequences place upon formulae used to represent these coefficients. (ERA citation 04:049360)



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4. Close book; have someone hold trimmed edge
5. Pull dental floss, first from one side, then from the other until separation is achieved.

COO-4381-6 PC **A02**/MF **A01**
Arizona Univ., Tucson. Optical Sciences Center.
Measurement of Roughness-Induced Wavelength Corrections to the Surface Plasmon Resonance in Silver.
J. A. Bush, D. K. Cohen, K. D. Scherkoske, and S. O. Sari. 1979, 12p
Contract EG-77-S-02-4381

A systematic study was made of the wavelength position of the surface plasma resonance in roughened silver foils. Frequency shifts in the resonance peak, produced by varying surface roughness parameters, were interpreted using a model calculation. A self-consistent comparison was made to angular scattered-light distributions from the same foils. Remarks are given concerning changes in silver reflectivity due to annealing. (ERA citation 04:051943)

CRN-PN-77-25 PC **A02**/MF **A01**
Strasbourg-1 Univ. (France). Centre de Recherches Nucleaires.
Laser Beam Annealing of Heavily Damaged Implanted Layers on Silicon.
J. C. Muller, A. Grob, J. J. Grob, R. Stuck, and P. Siffert. 1977, 11p
U.S. Sales Only.

The behavior during annealing of heavily doped silicon layers obtained by high current density ion implantation is investigated. The annealing is performed by a laser pulse and the surface layers are studied by Rutherford backscattering, SIMS, ellipsometry and conductivityy measurements. Comparisons with thermal annealing show the advantage of using laser pulses to restore the original crystallinity. (Atomindex citation 10:449837)

DOE/TIC-10162 PC **A14**/MF **A01**
Mobil Tyco Solar Energy Corp., Waltham, MA.
Mobil Tyco Solar Energy Corp. Second Quarterly Progress Report, January 31, 1979--March 31, 1979.
14 May 79, 325p
Contract W-7405-ENG-48

A materials science approach is taken to the recombination and device problems of amorphous silicon material. To address the recombination problem a systematic study of the materials is to be undertaken; first, by substituting for various percentages of the Si the various group IV atoms, C, Ge, Sn, and combinations of these. Secondly, the group IA atoms, Li, Na, K, or combinations of these will be substituted for the hydrogen, either wholly or in part. Progress is reported. (ERA citation 04:048277)

IPNO-77-05 PC **A02**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
Cryopump I.P.N. Cryogeny.
Jan 77, 11p
In French.
U.S. Sales Only.

The cryogenic department of the IPN realized a cryopump of the liquid helium bath type. Performances are measured (pumping speed, consumption of cryofluids, holding time). (Atomindex citation 10:449930)

IS-T-864 PC **A04**/MF **A01**
Ames Lab., IA.
Design of a Low Temperature Translation Balance for the Measurement of Paramagnetic and Diamagnetic Susceptibilities.
G. S. Mowry. May 79, 54p
Contract W-7405-ENG-82
Thesis.

A modified Foex and Forrer Translation Balance has been designed for measuring the paramagnetic and diamagnetic properties of materials over the temperature range 77-300 exp 0 K. The systems' temperature range can eventually be extended to 4.2 exp 0 K. The apparatus incorporates a vertical Dewar of Standard variety in addition to a horizontal Dewar for cooling the sample holder and adjacent horizontal supports. The design also allows for the placement of a thermocouple junction in direct contact with a sample. The balance sensitivity, defined as the change in displacement per unit applied force, is 0.0044 cm/dyne. The precision of the balance is +- .5% with an accuracy of 1.5%. (ERA citation 04:055457)

LA-UR-79-1750 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Microprobe Field Measurements in ErRh sub 4 B sub 4.
R. D. Taylor, and J. O. Willis. 1979, 9p CONF-790653-8
Contract W-7405-ENG-36
Superconductivity in d- and f-band metals, San Diego, CA, USA, 21 Jun 1979.

A small hyperfine field at Fe impurity sites in ErRh sub 4 B sub 4 at 0.38 K was observed. The magnitude of the field at the nonmagnetic impurity sites was 0.5 T. This hyperfine field reflects spin order at the Er sites but the sensitivity of the probe technique employed turned out to be marginal for investigating quantitatively the shape of the ordering curve with temperature near and below T/sub c2/. (ERA citation 04:051994)

LA-UR-79-2094 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Magnetic Behavior at the Iron Sites in Pd Fe Mn Alloys.
R. D. Taylor, and J. O. Willis. 1979, 8p CONF-790909-2
Contract W-7405-ENG-36
International conference on magnetism, Munich, F.R. Germany, Sep 1979.

Moessbauer Effect hyperfine measurements of (Pd sub 0 sub 9965 Fe sub 0 sub 0035)/sub 1-x/ Mn/sub x/ have been obtained for $1.1 < T < 30$ K and $0 < H < 6$T for $x = 0.01, 0.05, 0.06$, and 0.065. Ferromagnetic ordering is clear for $x = 0.01$ and is suggested for $x = 0.05$ at 4 K. At 1.1 K ordering at the iron sites in all samples, except $x = 0.01$, is consistent with a spin-glass or antiferromagnetic phase. (ERA citation 04:051946)

PB80-103757 Not available NTIS
National Bureau of Standards, Washington, DC.
Strain Dependence of the Critical Current and Critical Field in Multifilamentary Nb3Sn Composites.
Final rept.,
J. W. Ekin. Jan 79, 4p
Pub. in IEEE (Institute of Electrical and Electronics Engineers) Transactions on Magnetics 15, n1, p197-200, Jan 79.

High-J sub C multifilamentary Nb3Sn superconductors with widely varying amounts of prestrain and critical field values can be characterized fairly accurately by a single normalized critical field-strain relationship. Such a relationship permits first order prediction of critical-current degradation at arbitrary magnetic field magnitudes knowing only two parameters for any conductor, the prestrain and the maximum critical field. Some of the conductor-fabrication factors affecting the parameters are considered.

PB80-103765 Not available NTIS
National Bureau of Standards, Washington, DC.
Effect of Strain on the Critical Current of Nb3Ge.
Final rept.,
J. W. Ekin, and A. I. Braginski. Jan 79, 3p
Pub. in IEEE (Institute of Electrical and Electronics Engineers) Transactions on Magnetics 15, n1, p509-511, Jan 79.

The strain dependence of the critical-current density has been determined for composite tapes of Nb3Ge prepared by chemical vapor deposition. For Nb3Ge layers 3-4 micrometers thick deposited on a nickel-molybdenum-iron alloy substrate, the critical current monotonically increases when uniaxially strained to about 0.6 percent. This strain corresponds almost exactly to the compressive strain that would be introduced into the Nb3Ge by the substrate due to thermal contraction during cooldown after reaction. The increase in critical current was relatively small, about 6 1/2 percent at 7T and 5 1/2 percent at 4T. At higher strain, the critical current decreased rapidly, falling by more than 50 percent at a strain of 0.9 percent, for example. For Nb3Ge deposited on a tantalum substrate, however, the critical current monotonically decreased, falling by more than 50 percent at a strain of 0.4 percent. The results indicate that Nb3Ge can withstand considerable compressive strain (at least 0.6 percent), but fractures at tensile strains of only 0.1 to 0.2 percent.

PB80-104474 Not available NTIS
National Bureau of Standards, Washington, DC.
The Development of Standards for Practical Superconductors.
Final rept.,
A. F. Clark, J. W. Ekin, R. Radebaugh, and D. T. Read. Jan 79, 4p
Sponsored in part by Air Force Office of Scientific Research, Bolling AFB, DC.
Pub. in IEEE (Institute of Electrical and Electronics Engineers) Transactions on Magnetics 15, n1, p224-227, Jan 79.

The program to develop standard measurement practices for practical superconductors includes the generation of uniform definitions of terms, the development of standard measurement techniques, and comparisons of these measurements using standard reference materials. The initial sets of definitions have been published and their development will be described. Responses will be solicited on terms whose definitions are still in development or are controversial. The progress in the development of standard measurement techniques for critical current, transient losses and critical temperature will be discussed. The different techniques will be compared and the experimental parameters which must be carefully controlled will be enumerated.

SU-DMS-78-R-2 PC **A07**/MF **A01**
Stanford Univ., CA. Dept. of Materials Science and Engineering.
Photoelectronic Properties of II-VI Heterojunctions. Progress Report No. 3, March 1, 1978--February 28, 1979.
R. H. Bube. 1979, 131p
Contract EY-76-S-03-0326-047

Research on four principal problem areas is described in detail: (1) properties of heterojunctions formed by rf sputtering of indium--tin oxide (ITO) on single crystal p-type CdTe, together with information on CdTe surfaces and In/CdTe Schottky barriers; (2) the preparation of ZnO films by spray pyrolysis with good optical and electrical properties for the preparation of ZnO/CdTe heterojunctions; (3) the comparison of properties of Cu/sub x/S/CdS heterojunctions prepared by the dry process on thin-film CdS substrates with those prepared on single-crystal CdS substrates; and (4) initial exploration of electron microscopy of InSb/CdTe heterojunctions. (ERA citation 04:048287)

UCRL-82614 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Elastic and Plastic Properties of Uranium Dioxide from 5 to 330 GPa.
W. H. Gust. 14 May 79, 20p CONF-790709-3
Contract W-7405-ENG-48
VII international AIRAPT conference, La Creusot, France, 30 Jul 1979.

Published Hugoniot data for UO sub 2 is in error, because the measuring techniques used did not resolve the strong multiple-wave shock-structures present. Hence calculations related to liquid metal, fast-breeder-reactor, excursion analyses based on extrapolations of that data are in serious error. The inclined prism, flash gap, and two-stage gas-gun techniques are used to determine shock-compression parameters for UO sub 2 to 300 GPa. The Hugoniot elastic limit for UO sub 2 was found to be 5.7 GPa. At higher pressure, a plot of shock vs particle velocity displays a discontinuity between $1.0 < U/sub\ p/ < 1.8$ km/s, which appears to be a manifestation of a solid-solid phase transition. For $1.8 < U/sub\ p/ < 4.0$ km/s, the plot is given by $U/sub\ s/ = 5.8 + 1.28\ (U/sub\ p/ - 1.8)$. (ERA citation 04:051988)

UCRL-82614(Rev.1) PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Elastic and Plastic Properties of Uranium Dioxide from 5 to 330 GPa.
W. H. Gust. 11 Jul 79, 5p CONF-790709-3(Rev.1)

Contract W-7405-ENG-48
VII international AIRAPT conference, La Creusot, France, 30 Jul 1979.

We have measured the shock-compression parameters for UO sub 2 to 330 GPa. The Hugoniot elastic limit was found to be 5.7 GPa. Evidence for a shock-induced phase transition was observed at about 54 GPa. (ERA citation 04:050321)

20M. Thermodynamics

AD-A075 841/7 PC **A03**/MF **A01**
Johns Hopkins Univ Laurel Md Applied Physics Lab
The Alternating Phase Truncation Method for Numerical Solution of a Stefan Problem,
Joel C. W. Rogers , Alan E. Berger , and Melvyn Ciment. 21 Mar 77, 26p Rept no. APL/JPU-REPRINT-2090
Contract N00024-78-C-5384
Pub. in SIAM Jnl. of Numerical Analysis, v16 n4 p563-587 Aug 79.

No abstract available.

N80-10457/3 PC **A03**/MF **A01**
Cornell Univ., Ithaca, N. Y. Center for Radiophysics and Space Research.
Effects of Truncation in Modal Representations of Thermal Convection.
P. S. Marcus. Nov 79, 35p NASA-CR-162251, CRSR-730
Contracts NGR-33-010-186, NSF ATM-76-10424

The Galerkin (including single-mode and Lorenz) equations were examined for convection in a sphere to determine which physical processes are neglected when the equations of motion are truncated too severely. The conclusions were tested by calculating solutions to the equations of motion for different values of the Rayleigh number and for different values of the limit of the horizontal spatial resolution. It was shown that the transitions from steady state to periodic, then to aperiodic convection depend not only on the Rayleigh number but also very strongly on the horizontal resolution. One of the effects of truncation is to enhance the high wavenumber end of the kinetic energy and thermal variance spectra. The numerical examples indicate that as long as the kinetic energy spectrum decreases with wavenumber, a truncation gives a qualitatively correct solution.

20N. Wave Propagation

AD-A076 150/2 PC **A06**/MF **A01**
Arcon Corp Waltham Ma
Mathematical Analysis and Programming as Applied to Electromagnetic Propagation and Antenna Design.
Final technical rept. 28 Sep 76-30 Jun 78,
John O'Brien , Ilya Koltunov , Peter Wintersteiner , and Ben-Zion Guz. Jun 79, 122p RADC-TR-79-146
Contract F19628-76-C-0310

In this report, the analysis and programming for various problems in the field of Electromagnetic propagation and antenna design are considered. The scope of our work extended into a variety of technical areas. Among the technical areas are: Magneto-acoustic surface waves, Signal analysis, Polar VLF propagation, Ionospheric pulse reflections, Detection and tracking of targets, and Antenna Design. (Author)

AD-A076 306/0 PC **A04**/MF **A01**
Naval Ocean Systems Center San Diego Ca
A Computer Program for ELF/VLF Pulse Propagation in a Laterally Homogeneous Earth-Ionosphere Waveguide.
Interim rept. 1 Feb-30 Jun 79,
R. A. Pappert , and L. R. Shockey. 31 Aug 79, 57p Rept no. NOSC/TR-444

This report contains a computer program designed to handle pulse propagation problems when the propagation channel is the earth-ionospheric waveguide. The program is intended for use in the elf/vlf bands for laterally homogeneous channels. Mode data as a function of frequency from a waveguide program are required inputs to the present program. The mode data are interpolated using cubic splines, and the requisite integrals are treated numerically by means of the fast Fourier transform. (Author)

AD-A076 344/1 PC **A04**/MF **A01**
New Jersey Inst of Tech Newark
Ray Optical Description of Waves Guided by Integrated Dielectric Cylinder-Cone Structures.
Final technical rept. 29 Jan 76-31 May 79,
G. M. Whitman , P. Lisman , and S. J. Maurer. Oct 79, 57p ARO-13677.1-ELX
Grant DAAG29-77-G-0094
Prepared in cooperation with Analytic Sciences Corp., MA and the New York Inst. of Tech., NY. Continuation of Grant DAAG29-76-G-0131.

The techniques of ray-optics, which have provided meaningful results in the study of electromagnetic and acoustic problems, are applied to the integrated dielectric cylinder-cone configuration. The method geometrical optics is presented. The eiconal and transport equations are derived. Asymptotic boundary conditions are dicussed and a generalized reflection coefficient introduced. Before investigating the cylinder-cone non-separable geometry, and understanding of the ray structure in both an infinite dielectric cylinder and, separately, in an infinite dielectric cone is needed. This is accomplished in the report and, consequently, amplitude and phase information is attained. In addition, caustics are discussed. Caustics are envelopes of the ray systems and, thus, are surfaces which separate propagating and non-propagating (or complex evanescent) regions and characterize the modal ray systems in non-uniform regions. The report concludes with a discussion of the transition region between the cylinder and the cone. (Author)

21. PROPULSION AND FUELS

21B. Combustion and Ignition

AD-A075 870/6 PC **A04**/MF **A01**
Wright Air Development Center Wright-Patterson AFB OH
Studies on Burner Flames of Hydrogen-Oxygen Mixtures at High Pressures.
Final rept.,
Rudolph Edse. Apr 52, 69p Rept no. WADC-TR-52-59

A new apparatus for the study of bunsen burner flames at pressures up to 100 atmoshperes is described. With hydrogen-oxygen mixtures the flames at elevated pressures are always turbulent unless burner tubes with an inner diameter much smaller than 0.03 cm are used. The flash-back conditions of turbulent hydrogen-oxygen flames at atmospheric pressure and at 14.6 atmospheres are given by the critical velocity gradient at the wall of the burner tube. The temperature of the burner tip has a large effect on the flash-back tendency of the flame. For tubulent flames the critical flash-back gradient is larger than for laminar flames. The limit between stable flame and flash-back was found to be very sharp. From measurements of the flame pressures and from photographs of the flame cones it is concluded that the burning velocity of turbulent flames to not larger than that of laminar flames. Depending on mixture ratio the burning velocities of hydrogen-oxygen flames at 14.6 atmospheres are 2 to 3 times as large as those of atmospheric flames. From a theoretical consideration it is concluded that the burning velocities of hydrogen-oxygen flames increase with pressure because the flame temperatures increase with pressure, and thus also the heat conduction from the burning zone into the unburned gas. The intensity of the emission spectrum of hydrogen-oxygen flames recorded with a 21 ft. grating spectrograph is greatly increased with pressure. The iso-intensity method is used for the measurement of flame temperatures. (Author)

AD-A076 053/8 PC **A04**/MF **A01**
Aerojet Engineering Corp Azusa CA
Chemical Kinetics Phenomena in Rocket Engines.
Technical rept.,
S. C. Burket , G. Moe , and J. L. Nicholson. Jun 52, 53p WADC-TR-52-108
Contract AF 33(038)-18315

As part of an exploratory program of research in the chemical and physical kinetics of rocket exhaust gases, the emission spectra of rocket flames were examined with infrared, visible, and ultraviolet spectrographs of moderate dispersion. A high-speed portable grating spectrograph was constructed for observations in the visible region, and flames from rockets using ten different propellant combinations were photographed. The spectra have been analyzed and the species identified in most instances. A specially constructed infrared spectrograph disclosed a number of emission bands in the spectrum of the flame of a rocket using JP-3 and WFNA, but their identification and interpretation will require further study. Observations of the flames of rockets which will be tested in the future should be made with these instruments as well as with an ultraviolet spectrograph which is now available. A method for recording the changes in emission spectra along the axis of rocket exhaust flames was devised and tested. The method was shown to be feasible and should be applied to the study of a wide variety of rocket flames. It should be particularly valuable in determining the structure of the exhaust flame and in studying the phenomenon of exhaust flash.

AD-A076 169/2 PC **A03**/MF **A01**
Army Armament Research and Development Command Aberdeen Proving Ground Md Ballistics Research Lab
Propellant Combustion Diagnostics.
Memorandum rept.,
Nathan Klein , and George E. Keller. Sep 79, 47p ARBRL-MR-02953, AD-E430 316

A review of the present status of knowledge regarding gun propellant combustion under realistic conditions indicates that information is needed regarding spatial and temporal distribution of reaction products and intermediate species. Information as to the identity of a number of such species and the non-equilibrium 'temperature' of these materials is also urgently needed. A number of optical techniques have recently been developed that hold promise for producing some of the needed information. The complexity of the techniques and their level of development varies widely and their potential must be evaluated on a case-by-case basis as to which would be most amenable for use. A large portion of the equipment required for their exploitation is the same so that an effort in the general area of combustion diagnostics by advanced optical methods would make a number of the methods available for evaluation. Ancillary data concerning propellant functioning other than combustion would also become available if such a combustion diagnostics program were actively pursued. (Author)

FE-2463-15 PC **A02**/MF **A01**
FluiDyne Engineering Corp., Minneapolis, MN.
Industrial Application: Fluidized Bed Combustion Process. Quarterly Report, July--September 1977.
Nov 77, 24p
Contract EX-76-C-01-2463

The 18" combustor in-plant waste fuel test program began in early August and continued through the reporting period. Preparations for the Vertical Slice Combustor 500-hour test were also completed and the test was begun. Demonstration plant design activity consisted of updating plant load information, development of design package format and a schedule. Work was started on drawings and specifications for 80% design submittal. (ERA citation 04:027566)

M-78-68(V.1) PC **A10**/MF **A01**
MITRE Corp., McLean, VA. METREK Div.
Proceedings of the Fifth International Conference on Fluidized Bed Combustion. Volume 1: Overview.
C. Bliss, and B. M. Williams. Dec 78, 202p
CONF-771272-P1
Contract EX-76-C-01-2453
International conference on fluidized bed combustion, Washington, DC, USA, 12 Dec 1977.

This volume contains the keynote address (by S. David Freeman, TVA) and general overview talks on fluidized-bed combustion programs in: US DOE,

U.K., U.K. NCB (IEA services), German Federal Republic, US EPA, Ohio, New York State, TVA, EPRI and American Electric Power Service Corp. (ERA citation 04:038125)

N80-10330/2 PC **A02**/MF **A01**
Trenton State Coll., N. J.
Analytical Modeling of Flash-Back Phenomena.
C. C. Feng. 1 Nov 79, 17p NASA-CR-162389
Grant NSG-3180

To understand the flame flash-back phenomena more extensively, an analytical model was formed and a numerical program was written and tested to solve the set of differential equations describing the model. Results show that under a given set of conditions flame propagates in the boundary layer on a flat plate when the free stream is at or below 1.8 m/s.

ORO-5773-T1 PC **A03**/MF **A01**
George Washington Univ., Washington, DC. School of Engineering and Applied Science.
Characteristic Parameters in Combustion Processes and Their Accessibility to Current and Future Diagnostics. Progress Report, March 1, 1978--May 31, 1979.
R. Goulard. 31 May 79, 43p
Contract ER-78-S-05-5773

It is proposed to pursue the current evaluation of combustion diagnostics with a view to identify which diagnostics techniques are best suited to each particular set of experiments. It is important not only to establish the parameters to be measured in each case, but also their quantitative range; only thus can be achieved the selection of an appropriate measurement device or, if none is available, can the need for further instrumentation development be established. The criteria used for this evaluation are most affected by several areas in rapid development in the instrumental field (e.g. sensor noise limitation and real time data processing) and also by the new technological demands for scientific information (e.g. turbulence structure and particulate formation or destruction). Some of these aspects are reviewed in this proposal and it is expected that a complete review and set of evaluation criteria will be available at the end of this proposed second year of effort. (ERA citation 04:050426)

PB80-102429 Not available NTIS
National Bureau of Standards, Washington, DC.
From the History of Combustion Calorimetry.
Final rept.,
E. S. Domalski. 1979, 28p
Pub. in Combustion Calorimetry, n1, Chapter 18, p401-428 1979.

The history of combustion calorimetry is surveyed from the early part of the nineteenth century to its current state of development. Advances in calorimetric apparatus and techniques are presented; these are concurrent with improvements found in the precision and accuracy of the combustion data obtained from calorimetric investigations. A chronology of the use of benzoic acid as a calibration standard is given particular emphasis. Contributions by prominent calorimetrists are identified. This presentation of the history of combustion calorimetry is not a highly-detailed study of this branch of physical chemistry, but is an attempt to highlight significant phases of development over the past one hundred years. A bibliography containing 172 references is provided.

21D. Fuels

AD-A075 837/5 PC **A07**/MF **A01**
Transportation Systems Center Cambridge Ma
Symposium on Water-in-Fuel Emulsions in Combustion (2nd), 12-13 September 1978, Cambridge Massachusetts.
Final rept.,
Robert Walter. Aug 79, 139p TSU-USCG-79-6, USCG-D-50-79

This volume contains the proceedings of the second symposium on water-in-fuel emulsions held at the DOT Transportation Systems Center September 12 and 13, 1978. This symposium, sponsored by the DOT's U.S. Coast Guard and Research and Special Programs Administration, provided a forum for researchers involved in the use of water-in-fuel emulsions in combustion. Participants from academia, industry, and government contributed papers and discussed the properties, production, and utilization of water-in-fuel emulsions in boilers, diesels, and gas turbines. These proceedings contain the abstracts of 19 papers as well as the discussions on these papers and recommendations for needed research in emulsified fuel technology. Also included is a list of attendees. (Author)

BETC-001-2 PC **A04**/MF **A01**
Oklahoma State Univ., Stillwater. Dept. of Chemistry.
Characterization of High Boiling Fossil Fuel Distillates Via exp 1 H and exp 13 C NMR Analysis. Quarterly Report II, October 1, 1978--December 31, 1978.
K. D. Berlin, D. J. O'Donnell, and S. Sigle. 1978, 63p
Contract EW-78-S-19-0001

The goals reached in the second quarter of the original contract are the completion of the exp 1 H NMR analysis of all of the concentrates (monoaromatic, diaromatic, polyaromatic-polar and saturates) and GPC (gel permeation chromatography) fractions 211-76 No. 16 and 24 (diaromatic) and 210-76 No. 16, 21 and 26 (polyaromatic-polar) distillates (535 to 670 exp 0 C) of Wilmington crude and the concentrates and GPC fractions 207-76 No. 15 and 24 (diaromatic) and 208-76 No. 15, 20 and 25 (polyaromatic-polar) of Gach Saran crude. In addition, the exp 13 C NMR analysis was completed of the monoaromatic GPC fractions of Wilmington (209-76 No. 15 and 23) and Gach Saran (Concentrate and 206-76 No. 14, 18 and 22) distillates as well as the exp 13 C NMR analysis of the concentrates of the diaromatic, polyaromatic-polar and saturate fractions of Wilmington and Gach Saran distillates. The acquisition of exp 13 C NMR spectra of the remaining fractions is steadily progressing, although long acquisition times (for example, 63 hours per spectrum) will slow somewhat the rate at which data can be obtained. (ERA citation 04:049483)

BETC-001-3 PC **A03**/MF **A01**
Oklahoma State Univ., Stillwater. Dept. of Chemistry.
Characterization of High Boiling Fossil Fuel Distillates Via exp 1 H and exp 13 C NMR Analysis. Quarterly Report III, January 1, 1979-March 31, 1979.
K. D. Berlin, D. J. O'Donnell, and S. Sigle. 1979, 30p
Contract EW-78-S-19-0001

The main goal achieved this quarter was the successful completion of the exp 13 C NMR analysis of the diaromatic fractions of Wilmington (211-76; 16, 19 and 22) and Gach Saran (207-76; 15, 22 and 24) high boiling (535 to 675 exp 0 C) distillates. The analysis of additional samples supplied by DOE at our request, as well as the remainder of the samples submitted under the original contract, is currently underway. We have found from initial observations of the polyaromatic-polar fractions that the analysis time per sample must be increased to 84 h in order to obtain reliable data. (ERA citation 04:054152)

BNL-26210 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Flash Hydropyrolysis of Lignite and sub-Bituminous Coals to Both Liquid and Gaseous Hydrocarbon Products.
P. T. Fallon, B. Bhatt, and M. Steinberg. May 79, 18p CONF-790917-6
Contract EY-76-C-02-0016
American Chemical Society national meeting, Washington, DC, USA, 10 Sep 1979.

Flash Hydropyrolysis (FHP) is a short residence time (1 to 10 sec) gas phase noncatalytic coal hydrogenation process in which coal is converted directly to liquid and gaseous hydrocarbon products. Pulverized coal is contacted with hydrogen at elevated pressure and heated at average rates of 20,000 to 30,000 exp 0 C/sec causing thermally-induced fractures in the polycyclic structure of the coal molecule. The free radicals formed readily add on hydrogen thus increasing the hydrogen to carbon ratio of 0.8 in the feed coal to approximately 1 to 4 depending upon whether liquid or gaseous hydrocarbons are formed. The products are then rapidly quenched to terminate the reaction and to prevent any decomposition or recombination. The purpose of this work is to provide data on the process chemistry of the reaction by studying the liquid and gaseous products formed as they vary with such operating parameters as temperature, pressure, and residence time. These results are also applied to a kinetic model and an economic evaluation of a large scale integrated coal conversion processing plant. (ERA citation 04:054055)

BNL-26523 PC **A05**/MF **A01**
Brookhaven National Lab., Upton, NY.
Proceedings of the Hydride Storage Reservoir Symposium/Workshop.
M. J. Rosso, Jr. 1978, 79p CONF-7806165-
Contract EY-76-C-02-0016
Hydride storage reservoir symposium, Upton, NY, USA, 20 Jun 1978.

The use of metal hydrides as a storage medium for hydrogen is generally accepted to be a viable and useful technology. A number of scientific and engineering considerations remain to be answered and they provide the justification for this DOE sponsored Symposium/Workshop. The conference was held on June 20 and 21, 1978, at Brookhaven National Laboratory, and included a limited number of invited metal hydride experts. The main areas of interest, which set the guidelines for the twelve presentations and the workshop topics, included Hydride Reservoir Container Materials, Hydride Reservoir Internal Engineering Design, Hydride Bed Heat and Mass Transfer, and Hydride Fundamental Properties. These Proceedings include the abstracts of each of the formal presentations and the summations of each of the Workshop Chairmen. The full text of two papers which were not presented are included as Appendix B. The titles are Development of low cost nickel-rare earth hydrides for hydrogen storage and an exact solution of diffusion and absorption of hydrogen in uranium followed by fracture of the hydride. (ERA citation 04:054269)

CONF-790520-3 PC **A02**/MF **A01**
Karnatak Univ., Dharwar (India).
Evaluation of Methanol for Reduced Exhaust Emissions in a Single-Cylinder Research Engine.
B. S. Samaga, K. V. Gopala Krishnan, B. S. Murthy, R. K. Pefley, and R. L. Bechtold. 1979, 12p
International alcohol fuels technology, Asilomar, CA, USA, 28 May 1979.

The investigation examines the influence of different operating parameters on the formation of oxides of nitrogen, carbon monoxide, unburned fuel and the aldehydes when fueled by methanol and methanol-water mixtures. Also, the effect of adding small quantities of aniline on the burning rate and aldehydes exhaust has been explored. (ERA citation 04:051893)

CONF-790520-4 PC **A02**/MF **A01**
Department of Energy, Bartlesville, OK. Bartlesville Energy Technology Center.
Physical Properties of Gasoline/Alcohol Automotive Fuels.
F. W. Cox. 1979, 14p
International alcohol fuels technology, Asilomar, CA, USA, 28 May 1979.

Non-petroleum derived alcohols are likely candidates for near-future use as alternative automotive fuels. Low molecular weight alcohols may be used alone or in combination with gasoline, but either usage presents its own unique set of advantages and disadvantages. This report addresses the physical property changes (both beneficial and detrimental) which occur when alcohols are added to gasoline as fuel extenders. The experimental data and discussion of results cover four physical property areas: water tolerance, vapor pressure, distillation characteristics, and octane quality. The alcohols include methanol, ethanol, n-propanol, i-butanol, and synthetic methyl fuel. Several additional alcohols were tested, but only as gasoline/methanol cosolvents. The major objective of the physical properties study was to determine the interdependency among the variables which are responsible for the significant property changes so

that, where possible, gasoline/alcohol properties can be estimated from blend composition. Trends are also discussed in terms of the general influences of system variables. (ERA citation 04:051894)

CONF-790520-6 PC **A02**/MF **A01**
Department of Energy, Bartlesville, OK. Bartlesville Energy Technology Center.
50,000 Mile Methanol/Gasoline Blend Fleet Study: A Progress Report.
K. R. Stamper. 1979, 14p
International alcohol fuels technology, Asilomar, CA, USA, 28 May 1979.

Seven current production automobiles are being used in a fleet study to obtain operational experience in using 10% methanol/90% gasoline blends as an automotive fuel. Data from chassis dynamometer tests (run according to the 1975–1978 Federal test procedure) have been obtained, showing fuel economy and exhaust emissions of carbon monoxide, oxides of nitrogen, unburned fuel, methanol, and aldehydes. These data are shown for each of the vehicles when operated on the 10% methanol blend, and on unleaded low octane Indolene. Chassis dynamometer tests were run at 5,000-mile intervals during the 35,000 miles accumulated on each of the four 1977 model-year vehicles and at 5,000 and 10,000 mile accumulation levels for each of the three 1978 model-year vehicles. These data show an average decrease in volumetric fuel economy (approx. = 5%) and a reduction in carbon monoxide emissions associated with the use of the 10% methanol blend. Exhaust emission deterioration factors are projected from the Federal test procedure urban cycle data. The most severe driveability problems that have been encountered thus far into the program are related to operating on a phase separated fuel and materials compatibility problems with an elastomer in the air-fuel control hardware of one vehicle. (ERA citation 04:051895)

CONF-790520-7 PC **A02**/MF **A01**
Department of Energy, Bartlesville, OK. Bartlesville Energy Technology Center.
Driving Cycle Comparisons of Energy Economies and Emissions from an Alcohol and Gasoline Fueled Vehicle.
R. Bechtold, and B. Pullman. 1979, 13p
International alcohol fuels technology, Asilomar, CA, USA, 28 May 1979.

A late-model vehicle was converted to operate using methanol, gasoline, or ethanol as fuel and experimental work was done to obtain energy economy and exhaust emissions data for each of the three fuels. Results are compared at equal equivalence ratios both with and without an oxidation catalyst in the exhaust system. Using a catalyst for emissions control, unburned hydrocarbon emissions were lowest during lean operating conditions and were nearly the same for all three fuels under those conditions. Oxides of nitrogen emissions typically were reduced by over 50% in changing from gasoline to methanol or ethanol. Detailed composition of the exhaust hydrocarbons was determined from analysis via gas chromatography. These data were used for calculating photochemical reactivities and comparisons were made among the fuels during cold start and FTP weighted tests. Gasoline exhaust was often calculated to have the lowest total reactivity during the FTP, however, methanol exhaust reactivity was lowest for the stoichiometric condition with catalyst. Aldehydes accounted for large fractions of the reactivity calculated for methanol and ethanol exhausts. Cold start emissions were of about equal reactivity for gasoline and methanol. (ERA citation 04:051896)

CONF-790630- PC **A20**/MF **A01**
Department of Energy, Washington, DC. Div. of Fossil Fuel Extraction.
Proceedings of the 5TH Underground Coal Conversion Symposium.
May 79, 451p
Underground coal conversion symposium, Alexandria, VA, USA, 18 Jun 1979.

The 5th underground coal conversion symposium was held at Alexandria, Virginia, June 18–21, 1979. Thirty-three papers have been entered individually into EDB and ERA. Seven papers were also abstracted for Energy Abstracts for Policy Analysis. Seven papers had been entered previously from other sources. The symposium was sponsored by the US Department of Energy, Division of Fossil Fuel Extraction. (ERA citation 04:050939)

CONF-790638-4 PC **A02**/MF **A01**
Argonne National Lab., IL.
Preliminary Characterization of TASE Biomass Technologies.
J. P. Harper, S. W. Ballou, L. J. Habegger, A. A. Sobek, and A. A. Antonopoulos. 1979, 11p
Contract W-31-109-ENG-38
Annual biomass energy systems conference, Golden, CO, USA, 5 Jun 1979.

In 1978, the US Department of Energy initiated the TASE (Technology Assessment of Solar Energy) Program to assess the environmental consequences of increased utilization of solar energy. An overview of the TASE Program and a discussion of the biomass technologies characterized in Phase I is presented. Appropriate biomass conversion technologies were selected for various biomass feedstocks (i.e., agricultural and forestry residues, municipal wastes, manures, and agricultural and forestry energy crops). The technology characterization process involved: description of a model system; input/output analysis of material and energy flows into the system; estimation of the amount of residuals (e.g., particulates, SO/sub x/, etc.) generated during conversion; and estimation of capital and operating and maintenance costs for each system. Results were computed on a per Quad (10 exp 15 Btu) basis and coded for input into the SEAS (Strategic Environmental Assessment System) model. This discussion of the TASE biomass technology characterizations focuses on agricultural residues, forestry industry residues, and livestock wastes. (ERA citation 04:052796)

CONF-790917-4 PC **A02**/MF **A01**
Bituminous Coal Research, Inc., Monroeville, PA.
Reactivity of TRI-GAS Char in a Fluidized-Bed Reactor.
M. A. Colaluca, K. Mahajan, and M. A. Paisley. 1979, 13p
Contract ET-78-C-01-2798
American Chemical Society national meeting, Washington, DC, USA, 10 Sep 1979.

A two-phase fluidized-bed model can be used to predict the conversion observed in the char-steam gasification reaction in a 5.08-cm fluidized-bed reactor. The best fit of the experimental data was obtained using the K and L model to calculate the mass exchange between the bubble and particulate phases. (ERA citation 04:054027)

COO-0063-13 PC **A03**/MF **A01**
Duquesne Univ. of the Holy Ghost, Pittsburgh, PA. Dept. of Chemistry.
Hydrogen Bonding in Asphaltenes and Coal. Quarterly Report, January 1–March 31, 1979.
N. C. Li, K. C. Tewari, and T. Hara. Apr 79, 29p
Contract EY-76-S-02-0063

In this study, upgraded coal liquids from a blend of 30 weight percent of SRC I with 70 weight percent of SRC II, as well as from SRC II, have been studied by IR and NMR techniques. The variation of structural parameters of the upgraded liquids has been determined as a function of reaction temperature and contact time in the catalytic hydroprocessing. The results indicate that along with the decrease in heteroatom contents, asphaltene content, aromatic content and a corresponding increase in aliphatic content, the hydrogen-bonded structure and phenolic OH content of the coal liquids drastically decrease with increase in contact time and temperature. The disappearance of phenolic OH in upgrading process follows a first-order kinetics but no such dependence was observed in case of acidic NH. (ERA citation 04:048065)

COO-0063-14 PC **A02**/MF **A01**
Duquesne Univ., Pittsburgh, PA. Dept. of Chemistry.
Hydrogen Bonding in Asphaltenes and Coal. Quarterly Report for April 1, 1979–June 30, 1979.
N. C. Li, K. C. Tewari, and T. Hara. 16 Jul 79, 15p
Contract EY-76-S-02-0063

Structural analyses are reported of upgraded coal-liquids derived from catalytic hydroprocessing of a 30 to 70 blend SRC I with SRC II in a trickle bed reactor under different process conditions. The results indicate that along with the decrease in toluene insolubles, heteroatom (O,N,S) content, aromatic content and corresponding increase in aliphatic content, the hydrogen-bonded structure and phenolic OH content of the coal-liquid drastically decrease with increase in contact time and temperature. The specific gravity, aromaticity, and atomic C/H ratio of the upgraded liquids decrease linearly with the conversion of pentane-insolubles (TI + A) into pentane-soluble oil (HO). Increase in temperature from 672 exp 0 K to 694 exp 0 K, under present hydroprocessing conditions, accelerates thermal hydrocracking and increases the conversion of pentane-insolubles, with a marked decrease in specific gravity, viscosity, heteroatom content, and atomic C/H ratio of the upgraded liquid. Hydroprocessing conditions greatly influence the properties of asphaltene fractions. (ERA citation 04:052474)

COO-4916-1 PC **A02**/MF **A01**
Johns Hopkins Univ., Baltimore, MD. Dept. of Environmental Engineering Science.
Development of a Biomass Energy System for Drying Corn. Progress Report, July 1, 1978-June 30, 1979.
W. F. Buchele, P. W. Claar, II, and S. J. Marley. Jun 79, 14p
Contract EM-78-S-02-4916

The following research efforts have been carried out: evaluation of the design specifications and operation of the ISU-AE incinerator furnace; evaluation of existing furnace types for application to burning agriculatural residues; and design of a direct-fired furnace fueled by corn plant residues. The progress that has been made during the past year is summarized. Research has been carried out to provide the deisgn parameters for a new furnace prototype. (ERA citation 04:053546)

COO-5022-5 PC **A02**/MF **A01**
Gilbert/Commonwealth, Reading, PA.
Research and Evaluation of Biomass Resources/Conversion/Utilization Systems (Market/Experimental Analysis for Development of a Data Base for a Fuels from Biomass Model). Quarterly Technical Progress Report, January 1–March 31, 1979.
Y. K. Ahn, R. J. Brumberg, H. C. Chen, E. T. Nelson, and R. P. Stringer. 1979, 23p
Contract ET-78-C-02-5022

The progress made in the development of a linear programming model which will enable the energy manager to determine the right mix of biomass resources and conversion processes to produce the desired fuel is summarized. In the development of the model, a market analysis of the need for biomass derived fuels will be made and the regional availability of biomass resources determined on a seasonal basis. Biomass conversion profiles (gasification, pyrolysis, and direct combustion) will be developed for 100 biomass materials. (ERA citation 04:048304)

DOE/BC/30101-4 PC **A03**/MF **A01**
Oklahoma State Univ., Stillwater. Dept. of Chemistry.
Characterization of High Boiling Fossil Fuel Distillates Via exp 1 H and exp 13 C NMR Analysis. Quarterly Report IV, April 1–June 30, 1979.
K. D. Barlin, D. J. O'Donnel, and S. Sigle. 1979, 31p
Contract EW-78-S-19-0001

The completion of the exp 13 C NMR analysis of the Wilmington polyaromatic-polar fractions 210-76 No. 16, 21 and 26 and the Gach Saran polyaromatic-polar fractions 208-76 No. 15, 20 and 25 completed the investigation of samples submitted under the original contract. The analysis of several additional samples in these series proved helpful in assessing the consistency of the measuring techniques and also permitted a more accurate determination of trends observed within a particular series. Included in these extra samples were Gach Saran polyaromatic-polar fractions No. 23 and 26. The analysis of these two samples were

deemed appropriate when it was observed that the last fraction of the Gach Saran and Wilmington PAP series deviated from trends in Ar-C/Al-C observed in every other series investigated to date. The outcome of this investigation of additional fractions is discussed. (ERA citation 04:051119)

DOE/EIA-0035/1(78) PC **A05**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Monthly Energy Review, January 1978.
J. Gaynor. 1978, 96p

The US produced 4.2% more energy in November 1977 than in November 1976. Data are included for stocks of crude oil, fossil fuel imports, average daily consumption of energy from January-October 1977, and retail prices for fuels being consumed. Global aspects of petroleum production and consumption are detailed. (ERA citation 04:055065)

DOE/EIA-0035/10(77) PC **A05**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Monthly Energy Review, October 1977.
J. Gaynor. 1977, 96p

Domestic energy production in August 1977 averaged 162 trillion Btus per day. Imports of fossil fuels in August were about the same as in July and electricity generation in August declined 2% from its summer peak in July. The US consumed 4.4% more energy in the first 7 months of 1977 than in the same period of 1976. Data are given on additions made to the strategic petroleum reserve, oil and gas developments, and international aspects of petroleum consumption and production. Prices on fuels consumed during the month are tabulated. Specifically, data are given on crude oil and refined petroleum products, natural gas, coal, electric utilities, and nuclear power. (ERA citation 04:055074)

DOE/EIA-0035/11(77) PC **A05**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Monthly Energy Review, November 1977.
J. Gaynor. 1977, 95p

Energy output averaged 171 trillion Btus per day in September. Data on fossil fuel imports, stocks of crude oil and heating fuels, energy consumed in the US, oil and gas exploration and development, prices of fuels consumed during the month, and international aspects of petroleum consumption and production are provided. Specifically, data are supplied for crude oil and refined petroleum products, natural gas, coal, electric utilities, nuclear power, and stocks in the strategic petroleum reserves. (ERA citation 04:055075)

DOE/EIA-0035/12(77) PC **A05**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Monthly Energy Review, December 1977.
J. Gaynor. 1977, 93p

Domestic energy production in October 1977 totaled 5.23 quadrillion Btus. Data are presented on energy production, imports, domestic consumption, fuel stocks, additions to the strategic petroleum reserve, resource development, and prices of fuels consumed during the month. Specifically, data are presented on crude oil and refined petroleum products, natural gas, coal, electric utilities, and nuclear power. (ERA citation 04:055076)

DOE/EIA-0035/2(78) PC **A05**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Monthly Energy Review, February 1978.
J. Gaynor. 1978, 95p

Energy output during December averaged 150 trillion Btus per day. Total domestic energy production in 1977 amounted to 60.2 quadrillion Btus. Data on crude oil production, energy consumption, oil and gas development, and prices on fuels consumed during the month are presented. Details are given for crude oil and refined petroleum products, natural gas, coal, electric utilities, nuclear power. Global aspects of petroleum consumption and production are given. (ERA citation 04:055066)

DOE/EIA-0035/3(78) PC **A05**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Monthly Energy Review, March 1978.
J. Gaynor. 1978, 97p

Energy production in the US during January 1978 declined to its lowest level in 12 years on an annualized basis. Output during the month totaled 4.53 quadrillion Btus. Fossil fuel imports totaled 1.5 quadrillion Btus during January. Consumption of energy in the US during 1977 totaled 75.93 quadrillion Btus. Utilities produced 197 billion net kWh of electricity during January 1978. International aspects of petroleum consumption and crude oil production are summarized. Specifically, data on crude oil and refined petroleum products, natural gas, coal, electric utilities, nuclear power, and strategic petroleum reserves are included. (ERA citation 04:055067)

DOE/EIA-0035/4(78) PC **A05**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Monthly Energy Review, April 1978.
J. Gaynor. 1978, 96p

US energy production during the first two months of 1978 totaled 8.7 quadrillion Btus. Domestic energy production during this period averaged 243 trillion Btus per day. Utility electricity output during February 1978 was 6.5% greater than that for February 1977. Data on fossil fuel imports, world crude production and consumption, oil and gas developments, and strategic petroleum reserves are given. Specifically, data on crude oil and refined petroleum products, natural gas, coal, electric utilities, and nuclear power are tabulated. (ERA citation 04:055068)

DOE/EIA-0035/5(78) PC **A05**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Monthly Energy Review, May 1978.
J. Gaynor. 1978, 98p

A feature article, Short-Term Petroleum Supply and Demand, is presented. It was prepared in conjunction with Volume II of the 1977 EIA Annual Report to Congress that presents analyses and projections of US energy supply, demand, prices, and their impacts. An overview report is presented that shows energy production in the US during March 1978 averaged 156.2 trillion Btus per day. Also, the US consumed an average of 219.6 trillion Btus per day of energy. Data are tabulated on fossil fuel imports, stocks of fuels, global petroleum production and consumption, oil and gas developments, and prices of fuels consumed. Specifically, data are compiled on crude oil and refined petroleum products, natural gas, coal, electric utilities, nuclear power, and stocks of petroleum strategic reserves. (ERA citation 04:055069)

DOE/EIA-0035/6(78) PC **A05**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Monthly Energy Review, June 1978.
J. Gaylor. 1978, 93p

In April, energy production in the US totaled 5.13 quadrillion Btus. Fossil fuels imports into the US in April amounted to 1.4 quadrillion Btus. Revised domestic energy consumption totals for the first quarter of 1978 were 21.2 quadrillion Btus. Production of electricity by utilities amounted to 161.4 billion kWh. Prices of crude and refined products, international aspects of petroleum consumption and production, and oil and gas developments for the month are given. Specifically, data on crude oil and refined petroleum products, natural gas, coal, electric utilities, nuclear power, and stocks of the strategic petroleum reserves are tabulated. (ERA citation 04:055070)

DOE/EIA-0035/7(78) PC **A05**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Monthly Energy Review, July 1978.
J. Gaynor. 1978, 100p

Energy production in the US during May totaled 5.5 quadrillion Btus. Imports of fossil fuels were down compared to May 1977. Domestic energy consumption patterns have not altered significantly since the Arab oil embargo. Production of electricity by utilities totaled 175.2 billion kWh in May 1978. Other data provided are on oil and gas developments, international aspects of petroleum production and consumption, and prices of fuels consumed in the US during the month. Specifically, data are given on crude oil and refined petroleum products, natural gas, coal, electric utilities, nuclear power, and stocks of the strategic petroleum reserves. Included is a survey questionnaire asking subscribers to supply DOE with energy information on needs and interests. (ERA citation 04:055071)

DOE/EIA-0035/8(78) PC **A05**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Monthly Energy Review, August 1978.
S. C. Newman. 1978, 98p

During the month of June, domestic production of energy exceeded the level for June 1977. June 1978 production totaled 5.4 quadrillion Btus. Domestic consumption of energy during May was up 7.9% from the May 1977 level. Beginning with this issue, geothermal production and consumption, consumption of net coke imports, and exports of fossil fuels are included in the calculations. Production of electricity by utilities totaled 187.5 billion kWh in June 1978. Data are provided on oil and gas developments, international aspects of petroleum consumption and production, stocks in the strategic petroleum reserves, and prices of fuels consumed during the month. Specifically, data on crude oil and refined petroleum products, natural gas, coal, electric utilities, and nuclear power are given. (ERA citation 04:055072)

DOE/EIA-0035/9(78) PC **A05**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Monthly Energy Review, September 1978.
S. C. Newman. 1978, 96p

During the month of June, domestic production of energy totaled 5.3 quadrillion Btus. Domestic consumption of energy was up 2.4% from June 1977. Data are included on imports of fossil fuels, world crude oil production and consumption, oil and gas developments, and prices of fuels consumed during the month. Specifically, data are provided on crude oil and refined petroleum products, natural gas, coal, electric utilities, and nuclear power. (ERA citation 04:055073)

DOE/EIA-0064 PC **A02**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Coal Data: A Reference.
Sep 78, 25p

This report is a compilation of information about coal. It was prepared to help answer general inquiries concerning coal reserves (as of January 1, 1976), production, productivity and consumption exports, imports (all for 1947 to 1977). Included in the report are basic data that show important trends in the coal industry. (ERA citation 04:052518)

DOE/EIA-0075 PC **A09**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
EIA Report on Cost and Quality of Fuels to Electric Utilities, January-March 1978.
Aug 78, 185p

A summary of the cost and quality of fossil fuels delivered to electric utility generating plants in the US for the months of January, February, and March 1978 is presented. It includes fuel cost and quality data on a plant-by-plant basis, grouped by state and geographic region. Also contained in the report is information on fuels delivered to peaking units such as combustion turbines, internal combustion engines (diesel), and combined-cycle plants, in addition to steam-electric plant information. Fossil-fueled plants with a combined capacity of 25 MW or greater are covered. (ERA citation 04:055105)

DOE/EIA-0102/10 PC **A02**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Further Evaluation of Natural Gas Pricing Proposals. Analysis Memorandum AM/IA/78-17.
F. H. Murphy. 31 Jul 78, 18p

This paper presents an extension of the previous Energy Information Administration analysis of the

impact of several natural gas pricing proposals currently before the Congress, as compared to continued current regulations on natural gas markets. The principal new focus is on a different assumption about the way natural gas is priced to consumers under the Senate bill (H.R. 5289). The earlier analysis used the assumption that incremental pricing provisions legally imposed on interstate pipelines would be passed through by distribution companies to users. This analysis uses the assumption that the incremental pricing provisions do not go beyond the pipeline, and that prices of new supplies are rolled-in. The two analysis may be regarded as giving upper and lower limits to the actual outcome, which presumably would entail some roll-in and some passthrough, rather than being 100% one way or the other. The only significant impacts of changing the assumptions regarding downstream pricing provisions in the Senate bill are: changes in projected sectoral prices; and related projected sectoral volumes of consumption. The effect of assuming rolled-in pricing for the Senate bill as opposed to incremental pricing is to raise the gas price to the residential sector and lower it to the commercial, industrial, and raw material sectors. Except for the commercial sector, all retail gas prices under the rolled-in version of the Senate bill are higher than under the compromise proposal. Under this assumption the estimated impact of the compromise proposal is a projected residential price that is higher than that for the House bill, but lower than that for the Senate bill assuming rolled-in pricing. (ERA citation 04:054157)

DOE/EIA-0102/30 PC **A04**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Proposed Amendments to the Entitlements Program with Respect to Imported Residual Fuel Oil.
Jul 78, 68p

The following modifications to the Entitlements program for residual fuel oil are proposed by the Department of Energy: elimination of the so-called reverse entitlements for domestic refiners selling residual oil into the East Coast in excess of 5000 barrels per day by providing full entitlements runs credits for such sales; and increase in entitlements runs credits for importers of residual fuel oil from the current 30% of the fractional entitlement value applicable to crude oil to 100%, provided the product fee of the Mandatory Oil Import Program has been paid, or 100% minus the value of the product fee if the residual fuel oil is imported under a fee-free license; expansion of the program to all geographical areas historically dependent on imports; and adjustment of entitlements benefits provided to Virgin Islands refiners to offset their competitive advantage vis-a-vis Gulf Coast refiners due to an exemption from the Jones Act granted Virgin Islands refiners. (ERA citation 04:055091)

DOE/EIA-0102/5 PC **A09**/MF **A01**
Energy Information Administration, Washington, DC.
Evaluation of Natural Gas Pricing Proposals.
Jun 78, 196p

The results of an EIA analysis of several natural gas pricing proposals currently before the Congress, as compared to continued current regulations on natural gas markets are presented. For the purpose of this report the Series C Projection in the EIA Administrator's Annual Report was chosen to represent the reference case. The other reference cases used in that Annual Report would if used, change this analysis of impacts accordingly. The prices and quantities shown are for 1985 unless otherwise noted. The major impacts of the various proposals, using the Series C Projections, are summarized. (ERA citation 04:051124)

DOE/EIA-0115/77 PC **A02**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Supply, Demand, and Stocks of All Oils by P.A.D. Districts and Imports into the United States, by Country.
May 78, 20p

Supply, demand, and stocks of all oils by P.A.D. Districts and imports into the United States by country are presented for 1977. (ERA citation 04:053315)

DOE/EIA-0123(76) PC **A02**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Distribution of Oven and Beehive Coke and Breeze in 1976.
Jun 78, 25p

In 1976 shipments of coke produced in the US reached 61 million tons, up from 57.3 million tons in 1975. Shipments within the US in 1976 totaled 60.8 million tons, almost 7% higher than the 57 million tons shipped during the previous year. Coke exports totaled 292,000 tons, down from 318,000 tons in 1975. (ERA citation 04:054019)

DOE/EIA-0129/76 PC **A04**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Main Line Natural Gas Sales to Industrial Users: 1976.
Feb 78, 73p

Main line natural gas sales to industrial users by state and type of sale (1976), by SIC codes (1972 to 1976), by states and SIC codes (1972 to 1976), by natural gas companies and SIC codes (1972 to 1976), and by state (1972 to 1976), are presented in tabular form. (ERA citation 04:053322)

DOE/EIA-0131(76) PC **A02**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Natural Gas Production and Consumption: 1976.
7 Feb 78, 12p

Data are presented in tabular form on the salient statistics of natural gas in the United States (1972 to 1976); gross withdrawals and disposition of natural gas in the United States (1975 to 1976); quantity and value of marketed production of natural gas in the United States (1975 to 1976); marketed production, interstate shipments and total consumption of natural gas in the United States (1976); production of natural gas liquids at natural gas processing plants, natural gas processed, and extraction loss in 1975 and 1976; consumption of natural gas by use and by state (1976); natural gas input to and output from storage in 1976; underground storage capacity by state, December 31, 1976; producing gas and condensate wells in the US; and estimated total proved reserves of natural gas in the US. (ERA citation 04:053324)

DOE/EIA-0159(76) PC **A02**/MF **A01**
Energy Information Administration, Washington, DC.
Crude Petroleum, Petroleum Products, and Natural Gas Liquids in P.A.D. District V: Year 1976.
17 Feb 78, 7p

P.A.D. District V data are presented in tabular form on comparative analysis of military and civilian petroleum demand (1974--1976), domestic demand for petroleum products (1975, 1976), natural gas liquids and liquefied refinery gases production and stocks, and petroleum supply and demand. (ERA citation 04:051110)

DOE/EIS-0029(V.1) PC **E10**/MF **E10**
Department of Energy, Washington, DC.
Final Environmental Impact Statement. Strategic Petroleum Reserve: Texoma Group Salt Domes, Cameron and Calcasieu Parishes, Louisiana, and Jefferson County, Texas. Volume 1 of 5.
Nov 78, 410p

This document is a site specific Environmental Impact Statement (EIS) for four proposed candidate sites from the Texoma group of salt domes located in the Gulf Coast region of southwestern Louisiana and southeastern Texas. It also serves to supplement the Sulphur Mines Final Environmental Impact Statement by examining a new alternative water intake pipeline to the ICW, allowing use of a single water intake for Sulphur Mines and West Hackberry. The primary site for Strategic Petroleum Reserve (SPR) development in the Texoma group is an expansion of the West Hackberry Early Storage Reserve (ESR) facility located in Cameron Parish, Louisiana. The three other candidates are new sites: the Black Bayou salt dome located in Cameron Parish, Louisiana, the Vinton salt dome in Calcasieu Parish, Louisiana, and the Big Hill salt dome in Jefferson County, Texas. One or a combination of these three sites may be developed as an alternative to the expansion of the West Hackberry ESR facility. (ERA citation 04:025470)

DOE/EIS-0029(V.2) PC **E10**/MF **E10**
Department of Energy, Washington, DC.
Final Environmental Impact Statement. Strategic Petroleum Reserve: Texoma Group Salt Domes, Cameron and Calcasieu Parishes, Louisiana, and Jefferson County, Texas. Volume 2 of 5. Appendices A and B.
Nov 78, 439p

Volume 2 contains Appendices A and B: description of the project and description of the environment. The candidate Strategic Petroleum Reserve (SPR) sites in the Texoma group of salt domes are located in the southwestern corner of Louisiana and the adjacent southeastern corner of Texas, within a 40-mile radius of Nederland, Texas. The West Hackberry salt dome is the proposed site for SPR development in the Texoma group of salt domes. Three alternative sites (Black Bayou, Vinton salt dome, Big Hill salt dome) are discussed as proposed candidates for SPR development associated with the Texoma system. One or a combination of these three sites may be developed such that the total storage capacity for the Texoma group of salt domes will be 150 million barrels. The oil storage facilities are presently in the preliminary design stage. Engineering feasibility analyses have been prepared as the basis for evaluation of the socioeconomic and environmental impacts of the project. The impacts which would result from the construction and operation of the proposed raw water supply system for the Sulphur Mines SPR site are discussed. In Appendix B regional geology, water environment, climatology, air quality, ecosystems, natural and scenic resources, archaeological and historical resources, and socioeconomic characteristics are discussed. (ERA citation 04:025471)

DOE/EIS-0029(V.3) PC **E10**/MF **E10**
Department of Energy, Washington, DC.
Final Environmental Impact Statement. Strategic Petroleum Reserve: Texoma Group Salt Domes, Cameron and Calcasieu Parishes, Louisiana, and Jefferson County, Texas. Volume 3 of 5. Appendix C.
Nov 78, 433p

Volume 3 contains Appendix C--environmental impacts of the proposed and alternative actions. A detailed evaluation is made of the environmental impacts which would be associated with the construction and operation of the four candidate Strategic Petroleum Reserve salt dome sites. A discussion of impacts associated with alternative facility components is provided. (ERA citation 04:025472)

DOE/EIS-0029(V.4) PC **E10**/MF **E10**
Department of Energy, Washington, DC.
Final Environmental Impact Statement. Strategic Petroleum Reserve: Texoma Group Salt Domes, Cameron and Calcasieu Parishes, Louisiana, and Jefferson County, Texas. Volume 4 of 5. Appendices D-T.
Nov 78, 545p

Volume 4 contains Appendices D through T: precipitation data, water, sediment, and elutriate quality data, water, sediment, and elutriate standards and criteria, hydrologic data, water utilization data, subsurface water data, water withdrawal models, sediment transport calculations, aquifer pressure calculations, and the brine injection analyses for the Texoma Region; site-specific short-term and long-term emission rates and emissions from marine vessel transferring crude oil; site-specific short-term and long-term emission rates; noise impact criteria and analysis, oil spill risk and oil pollution incidents; risk of oil spill resulting from ship collision; petroleum tanker traffic and oil pollution incidents in the Gulf of Mexico and Caribbean Sea; ecological impacts of oil spills; thermal analysis of brine; summary of cavern construction processes; lists of species and ecosystems characteristic of the Louisiana and Texas Gulf Coast; modified Mercalli Intensity Scale of 1931; socioeconomic analysis; air quality impact of brine ponds at four Texoma sites; background oceanographic infor-

mation; sedimentology and geomorphology of the Gulf Coast; biological oceanography of the Gulf of Mexico; effects on fisheries of using Black Lake as a leaching/displacement water source; oil in brine model study; and selected characteristics of the aquatic environment near the proposed water intake. (ERA citation 04:025473)

DOE/EIS-0029(V.5) PC **E10**/MF **E10**
Department of Energy, Washington, DC.
Final Environmental Impact Statement. Strategic Petroleum Reserve, Texoma Group Salt Domes, Cameron and Calcasieu Parishes, Louisiana, and Jefferson County, Texas.
Nov 78, 445p

Volume 5 contains Appendices U and X: environmental survey of Texoma brine diffuser and comments received. (ERA citation 04:025474)

DOE/TIC-10320 PC **A03**/MF **A01**
JRB Associates, Inc., McLean, VA.
Industrial Petroleum Reserve (IPR). Amendment No. 2 to Final Report.
7 Jan 77, 30p

FEA has concluded that the benefits of an IPR are far outweighed by its costs. With the exception of the budgetary and conservation effects which would result from an IPR, all other benefits could be achieved with a carefully planned and designed SPR, fully owned by the USG. Moreover, if reduced government spending or the conservation benefits are desired or deemed necessary, there are much more efficient ways to achieve them than through the IPR. An excise tax, for example, could accomplish both of these objectives and at the same time avoid the numerous disadvantages and adverse aspects of an IPR. (ERA citation 04:048133)

DOE/TIC-10366 PC **A04**/MF **A01**
Federal Energy Administration, Washington, DC.
National Economic Impact of Alaskan Natural Gas Transportation Systems. Working Group Report.
30 Jun 77, 54p

The FPC Recommendation to the President compared the three alternative systems against two criteria, net national economic benefits and cost of service. All systems had substantial net benefits (from $5.8 billion to $8.2 billion) and a cost of service that was judged competitive with alternate fuels (a high of $2.26 per MCF). Alcan and Arctic had the highest net benefits and a lower cost of service than El Paso. This Task Force report examines the sensitivity of the FPC findings to different discount rates, cost overruns, and schedule delays and calculates new employment impacts. The new findings indicate that all of the systems still have positive net benefits ($3.3 billion to $4.8 billion) although reduced from the FPC levels and have increased costs of service (a high of $2.50 per MCF) which are still competitive with alternative fuels. Alcan has the highest benefits with El Paso second. Net benefits will be reduced to zero if any of the following occur: a construction delay greater than four years, construction cost increases of more than 100%, or a reduction in throughput from 2.4 BCFD to less than 1.2 BCFD. 22 tables. (ERA citation 04:049497)

DOE/TIC-10462 PC **A05**/MF **A01**
TRW, Inc., McLean, VA. Energy Systems Planning Div.
Strategic Petroleum Reserve and Liquefied Natural Gas Supplies. Final Report.
R. J. Fink, B. A. Bancroft, and T. M. Palmieri. 15 Feb 77, 80p

The United States is planning to import liquefied natural gas (LNG) to offset the effects of our apparent dwindling natural gas supply. These imports would begin by the 1980s and would come from Algeria, Indonesia, Pakistan, Iran, Nigeria, and possibly the Soviet Union. If a disruption in LNG supplies were to occur, the impact to the nation could be eased by supplying oil to those with dual fuel (oil or gas) capability. The Strategic Petroleum Reserve (SPR) could be called upon to supply this oil if an LNG embargo were to occur simultaneously with a foreign oil embargo. To assist the Strategic Petroleum Reserve Office (SPRO) in planning the SPR, this report analyzes the impact which would be caused by an LNG embargo alone and a simultaneous LNG and oil embaro. The latter is of prime importance since incremental oil demand caused by an LNG only embargo could be met from the normal oil suppliers. Assuming a 15% industrial dual fuel capability and 0.4 trillion cubic feet LNG annual import level (likely lower limits), incremental oil demand caused by an LNG and oil embargo would be an insignificant 0.02 million barrels per day; should imports rise to 3.8 Tcf and dual fuel capability increase to 85% of gas consumption (probable upper limits) incremental oil demand could rise to 1.28 MMbbl/d which represents 39% of total demand on the SPR. (ERA citation 04:049496)

DOE/TIC-10531 PC **A02**/MF **A01**
Federal Energy Administration, Washington, DC.
Economic Impact Evaluation of a Proposal Regarding Allocation of Increased Costs to Gasoline.
Mar 77, 25p

The amount of gasoline which domestic refiners are willing to supply is a function of the price which refiners receive for gasoline. The higher the price, the more gasoline refiners are willing to produce. The more stringent price controls on gasoline resulting from the decontrol of other refined products tend to induce domestic refiners to produce less gasoline, which could lead to greater dependence on imported gasoline and/or gasoline shortages. FEA is now proposing to allow refiners to allocate to gasoline a greater than volumetrically proportional amount of increased costs. Four alternative methods and their economic impact are examined. (ERA citation 04:051809)

DOE/TIC-10657 PC **A05**/MF **A01**
Federal Energy Administration, Washington, DC.
Proposed Gasoline and Diesel Fuel Rationing Contingency Plan. Contingency Rationing Regulations.
Apr 77, 90p

The contingency rationing plan, required by Section 203 of the Energy Policy and Conservation Act, if approved by the Congress, would remain in standby status unless the President finds that putting the plan into effect is required by a severe energy supply interruption or in order to fulfill obligations of the US under the international energy program and transmits such finding to the Congress, together with a statement of the effective date and manner for exercise of such plan. FEA will issue ration coupons and ration credits (ration rights) for each ration period equal to the total estimated supply of gasoline for the ration period. FEA would then distribute these ration rights through four basic programs. First, FEA would provide ration coupons to all eligible individuals. Second, FEA would provide ration credits to all firms which are engaged in priority activities for which a ration credit level has been established. These ration credits would be in addition to any ration coupons received by a person as an eligible individual. Third, FEA would distribute 3% of all ration rights through the State Hardship Reserves which would be used to meet the needs of certain specified users; e.g., handicapped persons, migrant workers, etc. Fourth, FEA would reserve 1% of the ration rights to distribute itself through the National Ration Reserve. (ERA citation 04:048763)

EPRI-FP-1028 PC **A07**/MF **A01**
Babcock and Wilcox Co., Alliance, OH. Research Center.
Characterization and Combustion of SRC II Fuel Oil. Final Report.
W. Downs, and A. J. Kubasco. Jun 79, 131p

This report deals with an experimental evaluation of the SRC II process's principal product, solvent refined coal fuel oil (SRC fuel oil), for use with commercial scale steam generating equipment. The purpose was to identify problems, if any, associated with handling, storing, pumping, and burning SRC fuel oil. Detailed fuels characterization analyses were performed and compared to petroleum distillate products. An industrial boiler rated at a steam flow of 45,000 lbs/hr was utilized for combustion tests. Modifications made to the boiler facility included connection of an existing air heater to supply combustion air at 400 exp 0 F, revamping of the boiler controls to permit biasing of the fuel/air ratio, installation of a high pressure mechanical return flow pumping and atomization system, various piping and pump modifications, and installation of various gas and particulate analysis instrumentation. Combustion tests were performed with SRC fuel oil, No. 2 fuel oil, and No. 5 fuel oil. Operating variables included load, excess air, and burner register settings. The laboratory fuel analyses indicated that in most respects this SRC fuel oil sample behaved similarly to No. 2 fuel oil. The combustion test confirmed that SRC fuel oil burns similarly to No. 2 fuel oil with one notable exception, NO/sub x/ emissions were substantially higher than for either the No. 2 or No. 5 fuel oils. It was concluded that SRC fuel oil will require the application of NO/sub x/ combustion control techniques to meet the proposed New Source Performance Standards of 0.5 pound NO sub 2 /million Btu when burned in power boilers equipped with wall-mounted burners. (ERA citation 04:049456)

FE-2031-13 PC **A04**/MF **A01**
University of Southern California, Los Angeles.
Chemistry and Structure of Coal-Derived Asphaltenes, Phase III. Quarterly Progress Report, July–September 1978.
T. F. Yen. 1978, 52p
Contract EX-76-C-01-2031

Preparative scale GPC separation of Synthoil asphaltene was carried out on styrene-divinyl benzene packing (Bio-Beads S-X8). The elution took place in the order of high to low molecular weight. Analyses indicate that aromatic ring systems with large saturated substituents elute first followed by more aromatic molecules with less saturated substituents. Infrared measurements on coal-derived asphaltenes were carried out with a large path cell (1 cm) in order to measure absorbance as a function of concentration in dilute solution down to 0.3 g/l where association between asphaltenes is not significant. VPO molecular weight studies indicate that coal-derived oils and resins undergo very little association in the solvent THF in the range 4 to 30 g/l in contrast to coal-derived asphaltenes and benzene insolubles. Thermal treatment of a Synthoil Coal liquid solvent fraction (oil + resin), in tetralin (1:2 wt. ratio) at 232 exp 0 C for 20 h resulted in the transformation of 3 to 10% of the oil + resin into asphaltene. These results support the proposed reversibility of coal liquefaction steps. Pryolysis of coal-derived asphaltenes has been shown to produce residues that are characteristic of coalesced mesophase. Asphaltenes from three liquefaction processes, Catalytic Incorporatd SRC, Synthoil, and FMC-COED, were pyrolyzed under a nitrogen atmosphere at 20 exp 0 C/h to 360 exp 0 C and at 5 exp 0 C/h to 420 exp 0 C. Crossed polarized light reflection micrographs showed a coarse deformed structure for Synthoil asphaltene, a course, but not deformed structure for Catalytic Inc. asphaltne, and a fine isotropic structure for FMC-COED asphaltene. (ERA citation 04:052477)

FE-2278-10 PC **A02**/MF **A01**
Oklahoma State Univ., Stillwater. School of Chemical Engineering.
Phase Equilibrium and Volumetric Properties of Coal-Derived Fluids. Quarterly Report, June 16–September 15, 1978.
R. L. Robinson, Jr. 1978, 10p
Contract EX-76-C-01-2278

Research was continued on (a) the volumetric properties of gases typical of those produced in coal gasification operations and (b) the vapor-liquid equilibrium behavior of mixtures typical of those occurring in the processing of coal-derived fluids. Data acquisition on gas volumetric properties using the Burnett apparatus has proceeded. Pure component compressibilities and virial coefficients were determined for CH sub 4 at 250 exp 0 C. In the vapor-liquid equilibrium study, measurements were begun on a five-component mixture of light hydrocarbons in aromatic solvents at 220 exp 0 F. Analytical problems have not been completely resolved in the determining of phase compositions by chromatography. (ERA citation 04:025251)

FE-2305-27 PC **A03**/MF **A01**
Gulf Research and Development Co., Pittsburgh, PA.
Investigation of Mechanisms of Hydrogen Transfer in Coal Hydrogenation. Quarterly Progress Report, July–September 1978.
D. C. Cronauer, R. G. Ruberto, Y. T. Shah, and R. J. Modi. Oct 78, 38p

Contract EX-76-C-01-2305

Experimentation is under way in the study of hydrogen transfer to asphaltenes and coal. About 24% of SRC-I derived asphaltenes were converted to pentane soluble oils when reacted with tetralin at 400 exp 0 C. The level of hydrogen transfer was about 0.8 g H sub 2 /100 g asphaltenes. This level of hydrogen transfer appeared to be essentially independent of time. Additional experimentation is under way at 425 exp 0 C and 450 exp 0 C. Surprisingly, a higher level of oils was formed when mesitylene was used as solvent in the reaction with asphaltenes at 400 exp 0 C. While little or no hydrogen was being transferred, there did appear to be a reaction of mesitylene with the asphaltenes. Again, this is being checked at higher reaction temperatures. It was observed that the SRC-I derived asphaltenes were relatively unreactive; therefore, experimentation is being undertaken with freshly prepared asphaltenes from runs of low severity - ideally those formed in the preheater. Experimentation with Kentucky 9/14 coal in the sand bath reactor unit has started with runs at 400 exp 0 C using tetralin or mesitylene as solvents. A series of 8 coal liquefaction runs were made in the continuous unit (CFSTR) using two levels of space time (6 and 12 minutes), two levels of temperature (375 and 400 exp 0 C), and two coals (Kentucky 9/14 and Illinois No. 6). Two additional points are noted. The plans for remaining experiments have been modified as spelled out herein. The feasibility of using a recently acquired deuterium-NMR for this project is being tested. This is consistent with our own plans and the requests of DOE. (ERA citation 04:052480)

FE-2537-11 PC **A02**/MF **A01**
Oklahoma State Univ., Stillwater. Dept. of Chemistry.
Characterization of Coal-Derived Liquids and Other Fossil Fuel Related Materials Employing Mass Spectrometry. Quarterly Report, March 30--June 29, 1979.
S. E. Scheppele. 3 Aug 79, 11p
Contract EX-76-S-01-2537

Extensive annual maintenance was performed on the mass spectrometer and ancillary equipment. The technique of micromolecular probe distillation-FI/MS was applied to the characterization of petroleum heavy ends. In this regard, the available standards for converting ion time centroids to ion m/e values in the high m/e region is inadequate. Development of a computer method for assigning most probable formulas to precise ion masses was completed. Considerable progress was made in preparing three manuscripts describing the method. The initial phase of a project which attempts to predict relative FI sensitivities from molecular parameters was completed. The effort to develop FI/MS as a technique for analyzing saturate hydrocarbons was extended to encompass total crude oils and the saturate fractions isolated from them. Preparation of publications describing our extensive characterization of the oils and asphaltenes from a COED coal liquid were essentially completed. The presence of numerous aromatic compounds containing two nitrogens in an anthracene oil was demonstrated. Characterization of an SRC-II coal liquid was initiated. (ERA citation 04:051008)

FE-3253-T1 PC **A02**/MF **A01**
West Virginia Univ., Morgantown. Dept. of Chemical Engineering.
Role of C--CO sub 2 in Gasification of Coal and Char. Annual Report, August 16--December 31, 1978.
C. Y. Wen, and J. T. Sears. 1978, 12p
Contract ET-78-S-01-3253

Reactivity of chars obtained by physical mixing of coal with catalyst additives followed by pyrolysis shows increased reactivity with K sub 2 CO sub 3 additive, but not with CaO. The E/sub act/ for CO sub 2 reaction with char-additive K sub 2 CO sub 3 is 20,000 cal/mole in the temperature range 600 to 800 exp 0 C, and reactivity has increased 5 to 10 times. Caution should be used in interpretation of these results because of complications from particle size effects and from variations in char oxygen with pyrolysis temperature. The LED-light probe for bubble detection in fluidized beds has been shown to work effectively. However, non-uniform gas distribution and non-vertical bubble rise make the use of the probe complicated. Future work will center on char reactivity, pore and surface area development with conversion, and measurement of effective diffusivities. (ERA citation 04:050987)

FE-6434-T1 PC **A04**/MF **A01**
Ideamatics, Inc., Washington, DC.
Determination of Functional and Data Requirements for Pipeline Information. Final Report on Task No. 2.
16 Feb 79, 59p
Contract EI-78-C-01-6434

This report describes the data needs of the DOE in the Pipeline area and how those needs are fulfilled by the information gathered on Form P. Chapter I provides an introduction to the methodology used in preparing the report, and background statements on Form P and on oil pipeline data. Chapter II defines the functional requirements of organizations/agencies which use pipeline information; Chapter III presents the data requirements for these same agencies; Chapter IV discusses publication requirements and formats for Form P data; and Chapter V summarizes conclusions and recommendations. (ERA citation 04:052563)

IS-T-871 PC **A09**/MF **A01**
Ames Lab., IA.
Methanation Reaction on Ruthenium Thin Films: A Mechanistic Investigation.
M. D. Slaughter. Jul 79, 186p
Contract W-7405-ENG-82
Thesis.

The kinetics of the methanation reaction were measured on thin ruthenium films in the temperature range 548 to 623K. The pressures of the reactant gases were varied over the ranges 1.5 to 1500 mu m for CO and 300 to 75000 mu m for H sub 2 to yield kinetic orders for each gas. The CO kinetic order varied from +1 at low pressures to -2 at high pressures. As the H sub 2 pressure was increased its kinetic order varied from +2 to -1. Both of these order plots had unusually sharp maxima. The reaction is zero order in both CH sub 4 and H sub 2 O. The apparent activation energy was dependent upon temperature with a value of 21.9 kcal/mole at 573K. Auger spectroscopy (AES) and x-ray photoelectron spectroscopy (XPS) indicated that the surface was always covered with carbon. This carbon could be divided into two types based upon its reactivity toward hydrogen. Type-1 was very reactive to 3.5 torr hydrogen doses at 573K and was completely removed in less than 300 seconds. Type-2 was less reactive and required about 48 hours under the same conditions for removal. No oxygen was ever detected on the surface after methanation. Low energy electron diffraction (LEED) and XPS indicated respectively, that neither graphite nor bulk carbide was associated with the used catalyst. The deposition of up to 0.75 monolayer of carbon enhanced the rate of methanation. More carbon caused a drop in the initial rate. Methanol could be hydrogenated to methane at about the same rate as carbon monoxide. A mechanism was developed which quantitatively fits the kinetic data and qualitatively predicts all of the other observations. This mechanism involves adsorbed hydrogen interacting with non-dissociated carbon monoxide. The rate limiting step involves the interaction of Ru--H and Ru--CH sub 3 to form methane. A methylene carbonyl hydride is believed to act as a reversible poison at high H sub 2 :CO ratios. (ERA citation 04:052455)

LBL-8901 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Intercomparison Study of Elemental Abundances in Raw and Spent Oil Shales.
J. P. Fox, J. C. Evans, T. R. Wildeman, and J. S. Fruchter. Mar 79, 25p CONF-790334-11
Contract W-7405-ENG-48
Oil shale symposium, Denver, CO, USA, 26 Mar 1979.

Two samples each of raw oil shale and spent oil shale were prepared as reference samples and analyzed by four laboratories using neutron activation analysis, x-ray fluorescence spectrometry, atomic absorption spectroscopy, and other techniques. Excellent agreement was obtained between techniques and laboratories except for the thin-film XRF technique. The %RMS deviations were less than or equal to 10% for 85% of the values. In general, the INAA analysis procedures yielded the most accurate and precise results. The XRF and colorimetric methods compared well with INAA but they were not as precise. Poor interlaboratory agreement was obtained for Cr, Co, Dy, and Sm by INAA, and an analytical problem was noted for As and Zr. Additional work is required to develop and validate reliable methods for B, F, Cd, and As. (ERA citation 04:048153)

NP-23456 PC **A07**/MF **A01**
InterGroup Consulting Economists Ltd., Winnipeg (Manitoba).
Liquid Fuels from Renewable Resources: Feasibility Study Summary and Conclusions.
May 78, 146p

The summary report highlights the results of a five-volume study on the potential large scale use of Canada's renewable forest, farm, and municipal waste resources to produce liquid fuel alternatives to gasoline, diesel fuel, and other petroleum fuels by the mid 1980's and beyond. The extent to which development of the liquid fuel alternative should be explored is examined and the relative merits of different strategies are assessed. It is concluded that liquid fuel markets (methanol, primarily) offer the opportunity for a major new Canadian renewable resource development which could contribute significantly to Canada's economic growth, international competitiveness, and balanced regional development, while providing a perpetually renewable source of liquid fuel energy. The study identifies priority government action areas that require attention if it is considered desirable to create this option for initial production by the mid-1980's. (ERA citation 04:025768)

N80-10379/9 PC **A13**/MF **A01**
BDM Corp., McLean, Va.
Coal Conversion Processes and Analysis Methodologies for Synthetic Fuels Production.
Final Report.
5 Oct 79, 285p NASA-CR-161322, BDM/W-79-548-TR
Contract NAS8-33608

Information to identify viable coal gasification and utilization technologies is presented. Analysis capabilities required to support design and implementation of coal based synthetic fuels complexes are identified. The potential market in the Southeast United States for coal based synthetic fuels is investigated. A requirements analysis to identify the types of modeling and analysis capabilities required to conduct and monitor coal gasification project designs is discussed. Models and methodologies to satisfy these requirements are identified and evaluated, and recommendations are developed. Requirements for development of technology and data needed to improve gasification feasibility and economies are examined.

STU-76-3449 PC **A03**/MF **A01**
Styrelsen foer Teknisk Utveckling, Stockholm (Sweden).
Pressing of Bark.
G. Soederman, T. Englesson, and L. Graernings.
Apr 78, 30p
In Swedish.
U.S. Sales Only.

Due to the development within the forestry industry the barking is mostly performed at the factories. The amount of bark at the factories has also increased due to the fact that most of the transportation is by heavy vehicles instead of by floating. The bark is used as fuel. The energy efficiency is dependent on the dryness of the bark. An incrase of the dryness will increase the heat effect drastically. The dryness of the bark could be increased by pressing or by flue gas drying. The report includes literature studies of assortments and quantities of bark as well as of moisture pickup of the bark and an attempt to determine the amounts of free and bound water, respectively. Pieces of bark have been pressed in order to determine the drynesses obtained at different pressures. (ERA citation 04:051207)

UT/CES-ES-3 PC **A06**/MF **A01**
Texas Univ. at Austin. Center for Energy Studies.

Utilization of Municipal Solid Waste from the City of Austin as Supplementary Fuel for Combination Firing with Coal at the Fayette Electric Power Plant.
A. Garcia G., and H. B. H. Cooper, Jr. Jun 78, 124p

It is technically and economically feasible to convert refuse collected from municipal and commercial sources into a fuel that could be used in combination with fossil fuels and to recover energy as a by-product. Several commercial processes are available to convert solid waste into a solid fuel which can be fired with coal. Coal hauled from Montana to the Fayette No. 1 power plant in La Grange, Texas, 62 miles from the city of Austin, will be one of the primary sources of energy. This study suggests that a solid fuel be extracted from Austin's solid waste which could be fired in a nine-to-one firing pattern at the power plant. Results from this pattern will be savings in coal, in land requirements, in materials, and in energy recovery. An added benefit will be better solid-waste management and cooperation of two organizations in their common environmental and disposal problems. Although research is needed in understanding some points in the system, it is environmentally, economically, and technically feasible. 18 references. (ERA citation 04:036736)

UT/CES-RR-11 PC **A10**/MF **A01**
Texas Univ. at Austin. Center for Energy Studies.
Systems Study and Assessment of Methacoal as a Coal Transportation Alternative. Final Report.
J. H. Vanston, Jr., and D. G. Hannan. Mar 78, 224p

The results of a preliminary study of the feasibility of transporting coal as a stable suspension of pulverized coal in methanol made from coal are reported. This stable suspension has been called methacoal. Alternative coal transportation modes are first reviewed. The methacoal concept for coal transport is then described. A material balance and cost analysis of the methanol and methacoal processes are then presented. A system concept design model is derived for the methacoal transportation concept. In conclusion the study results to date are summarized and a preliminary evaluation of the methacoal technology is provided. (ERA citation 04:028963)

21E. Jet and Gas Turbine Engines

AD-A075 881/3 PC **A02**/MF **A01**
Minnesota Univ Rosemount Rosemount Aeronautical Labs
An Experimental Investigation of the Use of Hot Gas Ejectors for Boundary Layer Removal.
Technical rept.,
Richard V. DeLeo , and Richard D. Wood. Apr 52, 11p WADC-TR-52-128-PT-1
Contract AF 33(038)-5131
See also Part 2, AD-A054 379.

The feasibility of using an ejector with heated primary flow as a suction pump for boundary layer air removal from an aircraft has been investigated. Effects of some of the basic ejector geometric and state parameters were evaluated. The results indicate that while boundary layer removal by this method is feasible the aerodynamic benefits so obtained are accompanied by a measurable loss of primary jet thrust. Tests show the ejector to be relatively insensitive to the geometric parameters of primary nozzle location and mixing section length. Ejector performance for a given geometry was found to be a function of the primary momentum. The addition of a diffuser substantially increased ejector performance but was accompanied by greatly reduced thrust. Results indicate that an optimum geometry exists for each combination of flow conditions. (Author)

AD-A076 116/3 PC **A04**/MF **A01**
Dayton Univ Oh Research Inst
Numerical Solution of a Supersonic Nozzle Afterbody Flow with Jet Exhaust.
Final rept. Sep 76-Feb 78,
Ameer G. Mikhail. Jun 79, 69p UDR-TR-79-43, AFFDL-TR-79-3078
Contract F33615-76-C-3145

Numerical solutions to the compressible turbulent Navier-Stokes equations for supersonic flow at Mach number 1.5, past an axisymmetric nozzle boattail with jet exhaust were obtained using MacCormack's explicit numerical scheme. The AGARD 10 deg.-nozzle was considered and a total of five cases were computed showing the effects of boattail geometry, jet-exhaust temperature, boattail wall temperature and the differences with the corresponding two-dimensional case. It was established that the hot boattail surface reduces the pressure drag significantly as does the hot jet exhaust when compared with the cold wall, cold exhaust case. The present approach can be used directly for boattailing nozzles for minimum pressure drag, as well as for a parametric study for aircraft designers. (Author)

AD-A076 126/2 PC **A13**/MF **A01**
Aeronautical Systems Div Wright-Patterson AFB Oh
proceedings of the Annual Tri-Service Meeting for Aircraft Engine Monitoring and Diagnostics (7th) HELD ON 5-7 December 1978, at Arnold Engineering Development Center, Arnold AFS Tennessee.
Final rept.,
James L. Pettigrew , and Keith Hamilton. 19 Jul 79, 291p Rept no. ASD-TR-79-5040

These proceedings contain an edited compilation of the presentations of government agencies at the Seventh Tri-Service Diagnostic Conference held at Arnold Engineering Development Center, Arnold Air Force Station Tennessee 5-7 Dec 1978. The program themes were current experience service needs and technology thrusts in aircraft turbine engine monitoring and diagnostics. Working level representatives from the maintenance organization of operating and support commands gave their views on the requirements for specific diagnostic and maintenance decision information. (Author)

AD-A076 204/7 PC **A10**/MF **A01**
Massachusetts Inst of Tech Cambridge Gas Turbine and Plasma Dynamics Lab
Boundary Layer and Wake Modifications to Compressor Design Systems: The Effect of Blade-to-Blade Flow Variations on the Mean Flow Field of a Transonic Rotor.
Final rept. 1 Sep 76-31 Aug 78,
Arun K. Sehra. Mar 79, 218p GT/PDL-144, AFAPL-TR-79-2010
Contract F33615-76-C-2118

The effect of blade-to-blade flow variations on the mean flow field of a highly loaded transonic axial flow compressor was invesitaged. The theoretical approach centered around modeling of three important phenomena associated with blade-to-blade flow fluctuations, which control the mean momentum and energy transfer processes. Apparent stresses were introduced into the mean flow momentum equations by pitchwise averaging. Loss concept of mean relative total pressure, due to conversion of mean flow kinetic energy to the energy of fluctuations, was introduced. Based on this concept, mean rothalpy and the production of apparent entropy were defined. An expression for mean rothalpy variation along the streamline was derived by pitchwise averaging of the energy equation. Mean flow equations suitable for the streamline curvature computational scheme were developed which include these three effects. Apparent stresses, mean rothalpy and apparent entropy variations were calculated from measured velocity fluctuations. The revised streamline curvature procedure was then used to predict the axisymmetric (peripheral mean) flow. The agreement of rotor outlet tangential velocity is excellent reproducing an unusual peak which is not explainable by usual techniques. The results showed that 3-D inviscid effects do not significantly modify the mean flow, and that the direct effect of apparent stresses on the mean flow is also small.

COO-2749-23 PC **A04**/MF **A01**
Chrysler Corp., Detroit, MI.
Baseline Gas Turbine Development Program. Twentieth Quarterly Progress Report, October 31, 1977.
F. W. Schmidt, and C. E. Wagner. 31 Oct 77, 75p
Contract EY-76-C-02-2749

Progress is reported for a program whose goals are to demonstrate an experimental Upgraded gas turbine powered automobile which meets the 1978 Federal Emissions Standards, has significantly improved fuel economy, and is competitive in performance, reliability, and potential manufacturing cost with the conventional piston engine powered, compact-size American automobile. Activity during this twentieth program quarter has continued to emphasize development towards correcting power deficiency in the Upgraded Engine. Though no absolute improvements have been realized in this quarter, ssignificant progress has been made in identifying causes, appropriately adjusting original design constraints, and proceeding with corrective designs. Specifically, to reduce endwall and secondary flow losses, a new low velocity compressor turbine inlet duct, and blading both with an increased height and lighter loading is being designed. A large increase in the power turbine annulus is being used to significantly lower blade Mach number and leaving loss. Progress is also being made in uniforming regenerator flow for better heat recovery, and in the development of control system components. A Public Interest Car has been built and has proved effective in communicating overall program benefits and goals. In the area of advanced engine development, work is now underway towards processing sintered alpha silicon carbide into high temperature turbine stage components. (ERA citation 04:050286)

COO-2749-31 PC **A05**/MF **A01**
Chrysler Corp., Detroit, MI.
Baseline Gas Turbine Development Program. Twenty-Second Quarterly Progress Report.
R. C. Pampreen, and C. E. Wagner. 30 Apr 78, 80p
Contract EY-76-C-02-2749

Progress is reported for a program whose goals are to demonstrate an experimental upgraded gas turbine-powered automobile which meets the 1978 Federal Emissions Standards, has significantly improved fuel economy, and is competitive in performance, reliability, and potential manufacturing cost with the conventional piston engine-powered, compact-size American automobile. Activity during this twenty-second program quarter has continued to emphasize development towards correcting a power deficiency in the Upgraded Engine. Efforts are also being directed towards reducing fuel usage through improved heat recovery and towards improving the mechanical reliability and control of the engine. (ERA citation 04:053415)

COO-4867-4 PC **A02**/MF **A01**
General Motors Corp., Indianapolis, IN. Detroit Diesel Allison Div.
Gas Turbine Engines and Transmissions for Bus Demonstration Programs. Technical Status Report, 30 April 1979-31 July 1979.
D. N. Nigro. Jul 79, 5p
Contract EM-78-C-02-4867

The quarterly status report covers the period from 30 April 1979 through 31 July 1979 and is a summary of DDA activities for the effort performed on the procurement and delivery of eleven (11) Allison GT 404-4 gas turbine engines and five (5) HT740CT and six (6) V730CT Allison automatic transmissions and the required associated software. The contract requires the delivery of eleven (11) Allison GT 404-4 Industrial Gas Turbine Engines and five (5) HT740CT and six (6) V730CT Allison Automatic Transmissions for the Greyhound and Transit Coaches, respectively. In addition, software items such as cost reports, technical reports, installation drawings, acceptance test data and parts lists are required. A recent decision by the DOE will modify the build configuration for the last four (4) Transit Coach engines. It was decided by the DOE at a meeting in Washington, DC on March 28, 1979 with representatives from DDA, NASA/LeRC, JPL and Booz-Allen and Hamilton that these engines will be built with ceramic regenerators. (ERA citation 04:055180)

EPRI-NP-888-SR PC **A07**/MF **A01**
Electric Power Research Inst., Palo Alto, CA.
EPRI Steam-Turbine-Related Research Projects.
F. Gelhaus, R. Jaffee, M. Koiar, and D. Poole. Aug 78, 149p

The current perspective is provided of EPRI-project activities that relate to steam turbine reliability.

Compiling status information is a part of the planning effort for continuing projects on turbine rotor reliability, turbine chemistry monitoring and materials behavior, and for the proposed project related to cracking of shrunk-on discs in low pressure nuclear steam turbines. This document includes related work beyond the steam turbine itself to cover those research projects whose scope and results impact the efforts specific to the turbine. (ERA citation 04:026204)

N80-10134/8 PC **A06**/MF **A01**
Douglas Aircraft Co., Inc., Long Beach, Calif.
An Efficient User-Oriented Method for Calculating Compressible Flow in an About Three-Dimensional Inlets.
Final Report, Nov. 1977 - Apr. 1979.
J. I. Hess, D. P. Mack, and N. O. Stockman. Apr 79, 117p NASA-CR-159578, MDC-J7733
Contract NAS3-21135

A panel method is used to calculate incompressible flow about arbitrary three-dimensional inlets with or without centerbodies for four fundamental flow conditions: unit onset flows parallel to each of the coordinate axes plus static operation. The computing time is scarcely longer than for a single solution. A linear superposition of these solutions quite rigorously gives incompressible flow about the inlet for any angle of attack, angle of yaw, and mass flow rate. Compressibility is accounted for by applying a well-proven correction to the incompressible flow. Since the computing times for the combination and the compressibility correction are small, flows at a large number of inlet operating conditions are obtained rather cheaply. Geometric input is aided by an automatic generating program. A number of graphical output features are provided to aid the user, including surface streamline tracing and automatic generation of curves of curves of constant pressure, Mach number, and flow inclination at selected inlet cross sections. The inlet method and use of the program are described. Illustrative results are presented.

N80-10204/9 PC **A07**/MF **A01**
Pratt and Whitney Aircraft Group, East Hartford, Conn.
Aero-Acoustic Tests of Duct-Burning Turbofan Exhaust Nozzles.
H. Kozlowski, and A. B. Packman. Jul 76, 142p
NASA-CR-162254, PWA-5296
Contract NAS3-17866

The acoustic and aerodynamic characteristics of several exhaust systems suitable for duct burning turbofan engines are evaluated. Scale models representing unsuppressed coannular exhaust systems are examined statically under varying exhaust conditions. Ejectors with both hardwall and acoustically treated inserts are investigated.

N80-10205/6 PC **A20**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Aeropropulsion 1979.
1979, 464p NASA-CP-2092, E-079
Conf-Proceedings of Conf. Held at Cleveland, Ohio, 1-16 May 1979.

No abstract available.

N80-10220/5 PC **A09**/MF **A01**
Pratt and Whitney Aircraft Group, East Hartford, Conn. Commercial Products Div.
Flight Effects on the AERO/Acoustic Characteristics of Inverted Profile Coannular Nozzles.
H. Kozlowski, and A. B. Packman. Feb 78, 195p
NASA-CR-162419, PWA-5501
Contract NAS3-17866

The effect of simulated flight speed on the acoustic and aerodynamic characteristics of coannular nozzles is examined. The noise and aerodynamic performance of the coannular nozzle exhaust systems over a large range of operating flight conditions is presented. The jet noise levels of the coannular nozzles are discussed. The impact of fan to primary nozzle area ratio and the presence of an ejector on flight effects are investigated. The impact of flight speed on the individual components of the coannular jet noise was ascertained.

N80-10221/3 PC **A05**/MF **A01**
Pratt and Whitney Aircraft Group, East Hartford, Conn.
Experimental Evaluation of a Low Emissions High Performance Duct Burner for Variable Cycle Engines (Vce).
Final Report.
R. P. Lohman, and R. J. Mador. 1979, 117p
NASA-CR-159694, PWA-5513-32
Contract NAS3-20602

A three-stage Vorbix duct burner was evaluated to determine the performance and emissions characteristics of this concept and to refine the configuration to provide acceptable durability and operational characteristics for its use in the VCE Testbed Program. The tests were conducted at representative takeoff, transonic climb and supersonic cruise inlet conditions for the VSCE-502B study engine. The carbon monoxide and unburned hydrocarbon emissions were low at all three operating conditions with combustion efficiencies in excess of 99.7 percent, as compared to the goal of 99.0 percent. Nitric oxide emissions were moderate but in excess of the program goal of 1 gm/kg at takeoff. The thrust efficiency exceeded the goal level of 94.5 percent reaching a value of 97 percent at supersonic cruise. Soft ignition, the absence of combustion generated acoustic instabilities and liner temperature levels acceptable for experimental hardware were also demonstrated. The total pressure loss across the duct burner, at 6.76 the loss mechanisms have been indentified and, in one configuration 40 percent of this excess loss was eliminated without comprising the emissions or thrust efficiency.

N80-10222/1 PC **A06**/MF **A01**
Pratt and Whitney Aircraft, East Hartford, Conn. Chemical Products Div.
Vsce Technology Definition Study.
Final Report.
R. A. Howlett, and R. B. Hunt. Aug 79, 114p
NASA-CR-159730, PWA-5630-11
Contract NAS3-21389

Refined design definition of the variable stream control engine (VSCE) concept for advanced supersonic transports is presented. Operating and performance features of the VSCE are discussed, including the engine components, thrust specific fuel consumption, weight, noise, and emission system. A preliminary engine design is presented.

N80-10515/8 PC **A04**/MF **A01**
Pratt and Whitney Aircraft Group, East Hartford, Conn. Commercial Products Div.
Effect of Time Dependent Flight Loads on Jt9d-7 Performance Deterioration.
A. Jay, and B. L. Lewis. 21 Aug 79, 73p NASA-CR-159681, PWA-5512-45
Contract NAS3-20632

The results of a modal transient analysis of the engine/aircraft system are presented. The response of the JT9D to analytically simulated vertical gusts and landings was predicted using a NASTRAN finite element mathematical model of the JT9D/747 propulsion system. The NASTRAN finite element model of the propulsion system included engine structural models of the fan, low/high pressure compressors, diffuser/turbine cases, and high/low pressure rotors, as well as nacelle models of the inlet cowl, tailcone, and wing pylon. The analysis conducted predicts that an insignificant level of JT9D-7 performance deterioration would occur due to a typical vertical gust encounter or a typical revenue service landing. Analysis of a high sink rate landing with a heavy fuel load indicates the possibility of local wear, however, the lack of an accurate dynamic rotor/seal interference model precludes an accurate quantitative evaluation of performance change for this once-per-airframe-life event.

21G. Reciprocating Engines

AD-A076 145/2 PC **A03**/MF **A01**
Engineering Development Establishment Maribyrnong (Australia)
Laboratory Investigation of the Performance of a Holden Engine Operating on Liquified Petroleum Gas,
N. Webb. Aug 79, 49p Rept no. EDE-28/79

A laboratory investigation into the relative performances of an engine when operated on both liquified petroleum gas (LPG) and petrol showed that the engine operated at higher termal efficiency on LPG and also that it would operate satisfactorily at leaner air-fuel mixtures on this fuel. Engine performance was less affected by retarded ignition for LPG than for petrol. Furthermore a large increase in dwell angle from the recommended setting had no significant effect on LPG performance. The LPG carburettor when installed in its normal configuration maintained an essentially constant mixture strength with no part throttle leaning of mixtures to give better efficiency nor corresponding full throttle enrichment to give best engine torque. (Author)

ANL/ES-76 PC **A08**/MF **A01**
Argonne National Lab., IL.
Assessment of Stirling Engine Potential in Total and Integrated Energy Systems.
T. J. Marciniak, J. C. Bratis, A. Davis, and C. Lee. Feb 79, 167p
Contract W-31-109-ENG-38

The development of Stirling engines for stationary power applications in Total Energy Systems is attractive for two main reasons: high potential engine efficiency, and fuel flexibility especially in the use of coal and coal-derived fuels. Total Energy applications are unique in that they offer an option for using fuel energy most effectively on a local basis by recovering the rejected heat from electric power generation to meet thermal requirements within a community. These thermal requirements include space heating, cooling, and hot water service demands. The advantages and disadvantages of large Stirling engines in Total, or Integrated, Energy Systems are discussed and the performance and cost characteristics of such engines are analyzed and compared with the main competitors (diesel engines and gas turbines) for such applications. The comparisons are made through simplified and detailed systems analyses. Lastly, based on the systems studied and intercomparisons of competing technologies, the requirements for the development of a large Stirling engine are outlined along with a suggested developmental program. From this study it is clear that, given the attributes of the competing technologies involved, the main advantage of the Stirling engine lies in its ability to use fuels other than distillates. This attribute must be developed further in order to provide engine technologies which can burn abundant fuels such as coal or coal-derived fuels. Secondarily, the potentially high efficiency of Stirlings would be especially advantageous in applications where a high electrical-to-thermal-energy demand ratio exists. (ERA citation 04:050283)

LBL-9423 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Hybrid Random Choice Method with Application to Internal Combustion Engines Ii.
G. A. Sod. Jun 79, 19p CONF-790840-1
Contract W-7405-ENG-48
International symposium on combustion processes, Karpacz, Poland, 26 Aug 1979.

A numerical procedure was introduced for solving one-dimensional equations of gas dynamics for a cylindrically or spherically symmetric flow. This method has been generalized to the two-dimensional equations of gas dynamics in a cylindrical geometry. This is coupled at the boundary with a new grid free method for introducing viscous effects, where the computational elements are segments of vortex sheets and circular vortex filaments. Examples are given for flow in a motored engine chamber during intake and compression strokes. (ERA citation 04:051884)

21H. Rocket Motors and Engines

AD-A076 012/4 PC **A23**/MF **A01**
Advisory Group for Aerospace Research and Development Neuilly-Sur-Seine (France)
Solid Rocket Motor Technology.
Conference proceedings.
Jul 79, 526p Rept no. AGARD-CP-259
Presented at the Meeting of the AGARD Propulsion and Energetics Panel (53rd) Held in Oslo, Norway, 2-5 Apr 79. Text in English and French.

Contents: Session 1-Survey Papers; Session II-Ignition, Extinction and Internal Ballistics; Session III-

Burn Rate Modelling and Combustion of Metal; Session IV-New Propellants; Session V-Combustion Instability; Session VI-Heat Transfer and Materials; Session VII-Testing and Instrumentation.

AD-A076 286/4 Not available NTIS
Defence Research Establishment Valcartier (Quebec)
An Improved Canadian 2.75-Inch Rocket Motor.
F. Jackson , F. A. Christie , M. N. Clark , G. L. Duchesne , and E. P. Morris. 1976, 8p Rept no. DREV-REPRINT-4176
Availability: Pub. in Proceedings of the AAIA/SAE Propulsion Conference (12th), Palo Alto, CA., 26-29 Jul 76, AIAA Paper no. 76-713 (No copies furnished by DTIC).

No abstract available.

21I. Rocket Propellants

AD-A076 065/2 PC **A06**/MF **A01**
Physical Sciences Inc Woburn Mass
Pulsed Laser Propulsion.
Final rept. 1 Sep 76-30 Sep 77,
Peter E. Nebolsine , Anthony N. Pirri , Jitendra S. Goela , and Girard A. Simons. Feb 78, 123p Rept no. PSI-TR-108
Contract N00014-76-C-0738, ARPA Order-3176

A fluid mechanical model is developed to assess the performance in both finite background pressure and vacuum environments of a rocket that is propelled by the absorption of radiant energy from a remotely stationed, repetitively pulsed laser. The model describes the gaseous propellant flow within a conical nozzle that is subjected to a series of point energy depositions at the apex of the cone. An equivalence between conical and parabolic nozzles is discussed for finite background pressure operation. The model predicts laser parameters necessary to achieve high specific impulses, i.e., 600 to 1000 sec. Scaling laws for high thrust - high specific impulse rocket systems are discussed.

N80-10378/1 PC **A05**/MF **A01**
Aerojet Liquid Rocket Co., Sacramento, Calif.
Photographic Combustion Characterization of LOX/Hydrocarbon Type Propellants.
D. C. Judd. 27 Jul 79, 84p NASA-CR-160318, DMT-113T-1

Single element injectors and two fuels were tested with the aim of photographically characterizing observed combustion phenomena. The three injectors tested were the O-F-O triplet, the transverse like on like (TLOL), and the rectangular unlike doublet (RUD). The fuels tested were RP-1 and propane. The hot firings were conducted in a specifically constructed chamber fitted with quartz windows for photographically viewing the impingement spray field. All LOX/HC testing demonstrated coking with the RP-1 fuel leaving far more soot than the propane fuel. No fuel freezing or popping was experienced under the test conditions evaluated. Carbon particle emission and combustion light brilliance increased with Pc for both fuels although RP-1 was far more energetic in this respect. The RSS phenomena appear to be present in the high Pc tests as evidenced by striations in the spray pattern and by separate fuel rich and oxidizer rich areas. The RUD element was also tested as a fuel rich gas generator element by switching the propellant circuits. Excessive sooting occurred at this low mixture ratio (0.55), precluding photographic data.

22. SPACE TECHNOLOGY

22A. Astronautics

N80-10265/0 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, D. C.
Short Description of Mathematical Support Programs for Space Experiments in the Interkosmos Program.
P. Y. Elyasberg. Jun 79, 25p NASA-TM-75629
Contract NASW-3198
Tran-Transl. Into English of "Kratkoye Opisaniye Programm Matematicheskogo Obespecheniya Kosmicheskikh Eksperimentov V Ramkakh Programmy "Interkosmos", Rept. Pr-431 Acad. Of Sci. Ussr, Inst. Of Space Res., Moscow, 1978 p 1-32. Subm-Transl. By Scientific Translation Service, Santa Barbara, Calif.

A synopsis of programs of mathematical support designed at the Institute for Cosmic Research of the USSR Academy of Sciences for cosmic experiments being conducted in the Interkosmos Program is presented. A short description of the appropriate algorithm is given.

N80-10273/4 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Washington, D. C.
Study of Periodic Motions of a Satellite with a Magnetic Damper.
Y. A. Sadov, and A. D. Teterin. Aug 79, 29p NASA-TM-75667
Contract NASW-3199
Tran-Transl. Into English of Preprint No. 35 (Moscow), 1979 32 p. Subm-Transl. By Kanner (Leo) Associates, Redwood City, Calif. Original DOC. Prep. By Academy of Sciences (Ussr), Moscow.

The motion of a satellite with a magnetic damper in the plane of a circular polar orbit is studied. The asymptotics of periodic solutions are constructed for a satellite close to axisymmetric and the radius of convergence is evaluated for the power series obtained. In a broad range of values of parameters, a periodic solution is obtained by numerical integration of equations of motion of the satellite. The asymptotics of a bifurcated curve obtained (the curve on which origin of a pair of periodic solutions occurs) in the space of the parameters agrees well with the results of numerical computation with all physical values of these parameters. A breakdown is made of the space of the initial data of phase variables in the field of effect of different types of periodic motion.

N80-10956/4 PC **A04**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
NSSDC Data Listing.
Aug 79, 51p NASA-TM-80349, NSSDC/WDC-A-R&S-79-05

Data available from the National Space Science Data Center (NSSDC) are listed. The spacecraft, principal investigator, the experiment, and time span of the data are given. A listing is also included of ground-based data, models, computer routines and composite spacecraft data that are available from NSSDC.

22B. Spacecraft

AD-A075 658/5 PC **A11**/MF **A01**
Air Force Flight Dynamics Lab Wright-Patterson AFB Oh
Investigation of a Deployable Polyurethane Foam Ground Impact Attenuation System for Aerospace Vehicles. Volume II. FIAS Test Numbers 49 through 91.
Final rept. Nov 76-May 78,
Stephen R. Mehaffie. Jul 79, 229p Rept no. AFFDL-TR-78-145-VOL-2
See also Volume 1, AD-A070 077.

An investigation was conducted to determine the feasibility of an advanced deployable impact attenuation system for use with aerospace vehicles. Performance of the system with a boilerplate AQM-34V RPV was quantified through a series of full-scale impact tests. A prototype design and costing analysis is presented. The conclusion was that the Foam Impact Attenuation System (FIAS) could provide the optimum system for the ground recovery of RPV's. (Author)

LA-7711-MS PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
NEPS Reactor and Heat Exchanger. Summary Status (December 1978).
D. R. Koenig. Jun 79, 21p
Contract W-7405-ENG-36

The design of a 3 MW(+) heat-pipe cooled nuclear reactor for electric propulsion of spacecrafts has been evolving continually. Several modifications have been made to make the reactor design more tolerant of potential heat pipe failures. Design parameters and operating characteristics for the modified reactor are presented. The desirability of separating the reactor assembly from the thermionic converter assembly has been recognized, and an intermediate heat exchanger to couple the two subassemblies together has been conceptualized. (ERA citation 04:051656)

N80-10272/6 PC **A16**/MF **A01**
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
Spacelab Payload Accommodation Handbook. Appendix B: Structure Interface Definition Module.
31 Jul 78, 354p NASA-TM-80808, ESA-SLP/2104-2-ISSUE-1

The mechanical interfaces between Spacelab and its payload are defined. The envelopes available for mounting payload hardware are specified together with the standard structural attachment interfaces. Overall load capabilities and the local load capabilities for individual attachment interfaces are defined for the standard mounting locations. The mechanical environment is defined and the mechanical interfaces between the payload and the EPDS, CDMS and ECS are included.

N80-10275/9 PC **A04**/MF **A01**
Axiomatix, Los Angeles, Calif.
Shuttle Orbiter Ku-Band Radar/Communications System Design Evaluation: High Gain Antenna/Wideboam Horn.
Interim Report.
R. Iwasaki, J. Dodds, and P. Broad. 31 Aug 79, 52p NASA-CR-160316, R7908-5
Contract NAS9-15795

The physical characteristics of the high gain antenna reflector and feed elements are described. Deficiencies in the sum feed are discussed, and lack of atmospheric venting is posed as a potential problem area. The measured RF performance of the high gain antenna is examined and the high sidelobe levels measured are related to the physical characteristics of the antenna. An examination of the attributes of the feed which might be influenced by temperature extremes shows that the antenna should be insensitive to temperature variations. Because the feed support bipod structure is considered a significant contributor to the high sidelobe levels measured in the azimuth plane, pod relocation, material changes, and shaping are suggested as improvements. Alternate feed designs are presented to further improve system performance. The widebeam horn and potential temperature effects due to the polarizer are discussed as well as in the effects of linear polarization on TDRS acquisition, and the effects of circular polarization on radar sidelobe avoidance. The radar detection probability is analyzed as a function of scan overlap and target range.

N80-10277/5 PC **A02**/MF **A01**
TRW Defense and Space Systems Group, Redondo Beach, Calif.
Implications of Possible Shuttle Charging.
W. W. L. Taylor. Oct 79, 16p NASA-CR-161283, REPT-30387-6016-RU-00
Contract NAS8-32580

Shuttle charging is discussed and two analyses of shuttle charging are performed. The first predicts the effective collecting area of a wire grid, biased with the respect to the potential of the magnetoplasma surrounding it. The second predicts the intensity of broadband electromagnetic noise that is emitted when surface electrostatic discharges occur between the beta cloth and the wire grid sewn on it.

N80-10458/1 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
An Experimental Investigation to Determine the Effect of Window Cooling by Mass Injection for the Shuttle Infrared Leeside Temperature Sensing (SILTS) Experiment.
P. F. Bradley. Sep 79, 44p NASA-TM-80170

The effect of mass injection on the shuttle infrared leeside temperature sensing (SILTS) pod window

surfaces in reducing window heating and minimizing window lens radiation during the reentry data taking period is investigated. Heat transfer coefficients on and around the simulated windows and window cavities are determined. Heat transfer rates and window coolant flow rates are reported for the SILTS configuration. A comparison of two windows' geometries and their effects on the heat transfer rate is discussed and oil flow photographs are presented to indicate how mass injection affects the flow field near the SILTS window.

22C. Spacecraft Trajectories and Reentry

AD-A076 013/2 PC **A04/MF A01**
Royal Aircraft Establishment Farnborough (England)

Skylab 1 Rocket, 1973-27B: Orbit Determination and Analysis.
Technical rept.,
D. G. King-Hele. 24 Apr 79, 69p RAE-TR-79044, DRIC-BR-68406

Contents: Introduction; The Observations; The Orbits; Analysis of the Observations; Revision of the Orbits, The 31:2 Resonance; Upper-Atmosphere Rotation; Analysis of Variations in Eccentricity due to Air Drag; Conclusions; Appendix: Correction of Eccentricity to Remove the Effect of the Day-To-Night Variation in Air Density.

N80-10150/4 PC **A03/MF A01**
National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
Navigation and Meteorological Error Equations for Some Aerodynamic Parameters.
M. J. Krikorian, J. Rice, and P. Mitchell. Aug 79, 37p NASA-TM-80804, REPT-79-FM-30

Mathematical equations for the analysis of the errors that are expected in a set of postflight aerodynamic parameters are presented. The errors are due to inaccuracies in the Shuttle best estimate trajectory and in the meteorological data obtained in support of the flights. The error analysis shows that the parameter vector, Z, and its associated error covariance matrix, C sub Z, is calculated from a given state vector, X, and its associated covariance matrix, C sub X.

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